



Frontispiece

THE BOOK OF THE SHIP

BY
G. GIBBARD JACKSON

AUTHOR OF
"THE SHIP UNDER STEAM," "THE WORLD'S RAILWAYS,"
"THE WORLD'S LOCOMOTIVES,"
"BRITISH LOCOMOTIVES,"
ETC., ETC.

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WITH AFFECTION
TO
PERCY T. JACKSON
A TRUE SON OF THE SEA

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G.G.J.

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THE BOOK OF THE SHIP

CHAPTER I

FROM LOG TO THREE DECKER

WHO made the first boat? That we shall never know. It is very possible that a boy, sporting about in a river, made the first little voyage. Possibly this boy was bathing, and swimming to and fro in a stream. As he swims he sees a tree trunk coming his way, brought down by floods. He is probably a little tired, so he swims to the log and gets astride it. The log goes floating down the stream, the boy in high glee at such easy travelling. At last he decides he must land. What shall he do? Leave the log to go on downstream, and so be lost to him? No, it will be splendid to have it again to-morrow; he will tell others, and they can join in the fun.

But the log is in mid-stream, how can it be brought safely to the bank? The boy tries many ways, and at length he finds that if he kicks out, as if swimming, he can guide the log in whatever direction he chooses. He guides it to the nearest bank, and lands, first taking care to tie up his craft with reeds, or similar material. Let us follow, in imagination, the next step. The following morning there are several boys astride the log, and all shout

in high glee at the wonderful adventure. We can suppose that their shouts attract fathers and elder brothers from their work, or hunting, and we shall not be far wrong in saying that the elders learn from the youngsters. Here is a new method of crossing streams. To secure a safer means of crossing we can imagine these pioneers fastening several logs together. By doing this cattle could be brought across streams which had no shallow fords; deer killed in hunting could be sent down stream, instead of being carried miles to the village, and, finally, whole families could be taken from place to place by means of these rafts.

The next step would be to scoop out the log, and thus get to the dug-out canoe. Such canoes are often discovered in all parts of the world. In every case the same general plan was followed, and, in most cases on record, there are signs that the scooping was done with the aid of fire.

These dug-outs took a long time to make, and they were rather cumbersome craft, none too safe. Thus we find the ancient voyagers trying another plan. This was the actual building of a canoe.

At first these were made of bark, similar to those which the discoverers of America found in use there. These, too, were rather unsafe, and then outriggers were used. These might be described as two pieces of wood stretching out from one side of the canoe; to these were attached a long piece of flat wood, usually the same length as the canoe.

The outrigger made the canoe a much safer vessel as it was almost impossible to upset it. This kind of craft was found in the South Seas by the earliest explorers, and is still largely used by the natives there.

In countries which had some traces of early civilization we find great improvements on the canoes of which we have been speaking.

The Bible tells us of the Ark, which was more, in the nature of a house-boat than a ship. In size, the Ark was almost exactly that of the average sailing vessel in use just before steamers came along.

Then we know, from the same source, that Solomon had fleets, or employed fleets, to bring to him the treasures he needed.

Here then, sails had been added, and no doubt those early voyagers, who used the rough logs, had found that their speed could be increased downstream, and progress made against the current, by tying up their grass mats upon the poles they had used to prod into the river bed.

Two other still earlier forms of craft ought to be mentioned. These were the basket-work coracle, and the similarly-shaped framework covered by the skins of animals taken in hunting. The round coracles were used by the Ancient Britons, who carried them on their backs, so that, when necessary, they could quickly take to water by depositing their burden on the shelving banks of a river. It is very probable that the skin-covered boat led the way to the bark canoe.

Britain has always been to the forefront in all kinds of boats and ships. When Julius Cæsar came to conquer Britain he was amazed to find his galleys opposed by quick-sailing vessels of fairly large size, which, he says, were built of oak, the beams held together by iron bolts. These British vessels, with their leather sails, gave the all-conquering Cæsar a great deal of trouble when

he was bringing his troops over the Channel. They cruised as far as the coast of Spain, and thought nothing of crossing the dreaded Bay of Biscay with its storms.

Had these early seamen possessed a fraction of the iron discipline which was found in the Roman naval forces, the history of our country might easily have been written very differently. It is more than possible that the Romans would have been defeated on the sea just as, in the years to come, so many foes were driven back.

At this period the ship was growing up in two distinct ways. There were the fast galleys on the smooth waters of the Mediterranean, driven by scores of rowers, helped in many cases by sails, though, in the main, they depended on the galley slaves, whose lives were worth so little.

In the rougher northern seas, especially off the Scandinavian coast, were the strong sea-going ships of the Vikings. These depended more on sails, though there were rowers carried for calm periods, and for occasions when speed was urgent.

Then, by degrees, we find the galleys growing into real ships in which rowers were absent, and sails the driving force. Here we have what might be termed the castellated hull; at either end of the ship there were miniature wooden castles. In these the fighting men were stationed, and so rude were the conditions at sea in those distant days that even the vessel which was sent out for commerce must needs carry her fighting men if she really wished to come back safe and sound.

In the fifteeneth century came the invention of cannon, and this straightway had a big effect on the ship of the period. To take the weight of the

guns, light in weight to us, but exceedingly heavy to our ancestors, the ships had to be made not only bigger, but less top-heavy.

The Spaniards, as we know from the accounts of the Armada, had very large ships, many of them over 1,500 tons. It was indeed fortunate for the English that the Spanish ships were so large, and that our forefathers had kept to the smaller and handier vessel. These "wasps of ships," as one authority describes them, were able to sail under the counter of the huge galleon, and pour all their batteries into her whilst her guns were simply firing into thin air.

Elizabeth collected a fleet of almost two hundred vessels, of all sizes, to repel the onslaught of the Spanish Armada, but only a fraction of the vessels which put to sea under the English flag belonged to the navy.

Merchant ships of all classes were hastily pressed into service, a few guns being put aboard, reliance being placed in the men who were to handle these ships rather than in their armament.

Many of these brave vessels were less than 100 tons burthen, and of the total of 15,550 men then in service against the Spaniards, less than half belonged to the Royal Navy.

There were, however, many large ships in the days of Queen Bess. There was the *Triumph*, for instance, the flagship of Sir Martin Frobisher, matched by the *St. Mathew*, both of 1,100 tons—large ships indeed for those far-off days. There were several of 900 tons, and so down the scale until little craft of only 20 tons were reached.

In those great days there were many lessons learned upon the venturous voyages which Elizabeth's

captains made in mere cockleshells of ships. From these enterprises came many developments in shipbuilding.

Whilst the hulls of the ships were growing larger, and were more strongly built, masts and rigging received especial attention.

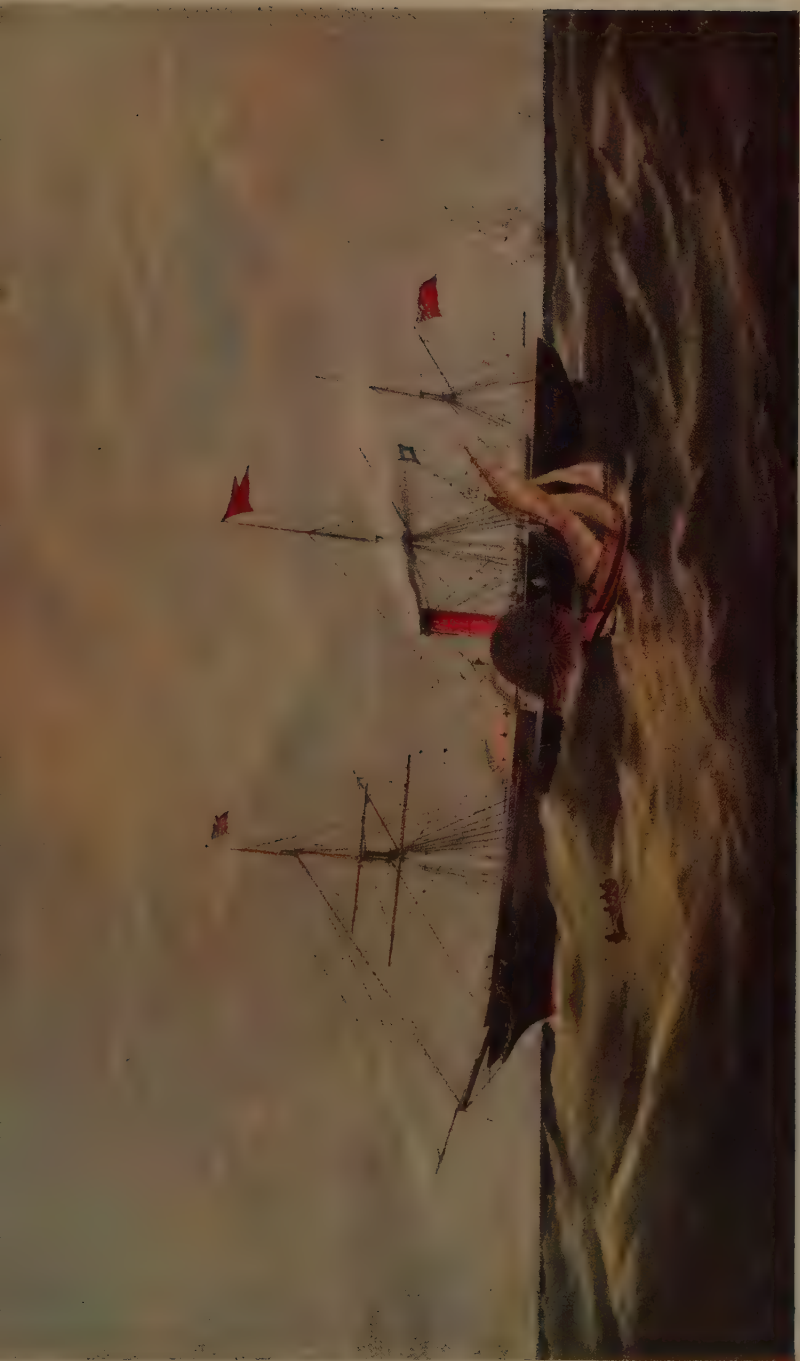
Prior to this period, the masts of ships had been in one long piece; now they were built up in sections, the top-mast being so arranged that it could be lowered whenever the weather warranted such a precaution.

In the days before Elizabeth's reign many a ship was lost because her pumps were so faulty that the hull could not be freed from the seas which had come aboard; a leak meant almost certain disaster if it proved of any magnitude. But, with the introduction of chain pumps, much greater safety was found.

Still another improvement of Elizabethan days was the lengthening and strengthening of anchor cables, enabling a ship to ride out a gale which, in earlier days, would have driven her ashore, or caused her to put to sea, there to encounter worse dangers and possible disaster.

Then larger anchors were possible because of the introduction of powerful capstans which enabled them to be lifted easily from the sea bed.

It would seem that from the days of Elizabeth onwards to those of the second Charles, English shipbuilders did not keep pace with their competitors abroad. It was commonly allowed that much better vessels in every respect, came from the Dutch, French and Spanish yards. No reason is assigned for our shortcomings in this respect, but there they were until Phineas Pett, a Master of



"ASIA"

One of the most successful of the early Cunard packets

Arts at Cambridge University, determined to employ his energies, and his ideas, to the improvement of the sailing ship. Like all other innovators, his plans were received with scant approval, and it did seem at one time that he would have to go back to his books and college.

Pett was a bold man, and having made up his mind on certain constructional points, he went ahead despite the intense opposition which he encountered.

Phineas Pett began his work long before Charles II came to the throne; indeed, fifty years before the Restoration he had a fine ship in service, opening up the shipbuilding era to which Pett's descendants were to add the crowning touches.

Phineas Pett felt that the ships of his day were too top heavy as regards their rigging, and his first step was to get rid of a lot of really useless top hamper, getting at once a more sea-worthy vessel.

His next step of importance was to alter completely the stem of the ships for which he was responsible, Right from the days of the galleys, the beak prow had persisted. In the *Prince Royal*, Pett made a distinct advance by getting rid of this unsatisfactory prow, which was probably quite satisfactory for the small galley, but certainly a grave disadvantage for a big ship.

The *Prince Royal* mounted a good number of really heavy guns—that is for her period. One great mistake was made in her construction, however; she was constructed of unseasoned timber, with the result that after a very short life, she was condemned. By this time Pett had reached out still further, and when, in 1637, he launched the *Sovereign*

of the *Seas*, he produced a warship which, in her day, was counted as great a wonder as the new *Nelson* in our own. This ship of Pett's was huge for her period, having a tonnage of 1,683; also, she was a three-decker. It was found that she was rather top heavy with her three decks, so she was taken in hand and cut down to a two-decker. In her original state the *Sovereign of the Seas* mounted 100 guns. When sixty years old, and as good as ever, she was, unfortunately, set on fire whilst being refitted at Chatham. This fine ship served through the sway of Cromwell, when our navy was certainly more efficient than it had been, largely due to the fact that Pett's designs and methods found ready copyists. It came about, therefore, that by the time Pepys was writing his diary, and looking after the navy himself, the stigma that Britain could not build ships so well as foreigners no longer held.

It is all the more remarkable that this superiority in ship-building should have come about at a time when England was in the throes of a civil war, which was fought on land, and not on sea.

Often sea battles will result directly in new types of ships and improvements on the old. One would have thought that there would have been little time for improvement in things afloat when so much that mattered was happening ashore. But the fact remains that Charles I, Cromwell, Charles II, and especially his brother, the Duke of York, afterwards King James II, found time to look into the building and equipment of fine naval ships. True, Pepys complains too frequently that money voted for the navy was diverted to other, and less noble, enterprises; at the same time this wonderful chronicler



The Arrival of an Indianman

This shows an Indianman hove to off Scilly, signalling for a pilot, who can be seen rowing off to her in his punt. In the distance are two clipper ships standing up channel. Some of these Indianmen made wonderfully quick passages. They had very large crews, and were able to carry a press of sail.



"Cutty Sark"

[Topical Photo Agency]



"Lightning"

[Nautical Photo Agency]

One of the fastest clippers ever set afloat.

FROM LOG TO THREE DECKER 9

of this period shows, very clearly, that Charles and James were both keenly interested in the Navy and its ships. Possibly they thought more of the ships than the men who fought them, with the result that the poor Jack tars were often starving, and always in arrear with their pay.

CHAPTER II

THE GREAT DAYS OF SAIL

THE eighteenth century saw a vast improvement in the ship, and it may be claimed that it came about from two distinct reasons. The first was because of the lessons learned in the sea fights between Britain and the Continental nations, such as the Dutch, French and Spanish, and secondly because the work of exploring the unknown seas was being pushed forward.

For the latter ventures quite small ships were chartered, and despite their size, they made some wonderful voyages. Followed the desire for trade, and here larger ships were necessary, and the ship-builders had to supply them.

The development of the sailing ship as a mercantile unit can best be followed by taking the fleet of the famous East India Company. The East Indiamen were amongst the last passenger sailing ships, and at the opening of the nineteenth century had a very high reputation.

The Honourable East India Company was already well established in the reign of Charles II, and, by 1680, they had a fleet of splendid vessels whose tonnage ranged from 100 to 775. The fleet numbered 35 ships at this date, and during the next few years was greatly augmented; the vessels showed also a considerable increase in size.

By 1690 there were many East Indiamen exceeding 1,000 tons, some of them reaching 1,300 tons.

The growth in the size of these stoutly built vessels was not due entirely to the needs of the trade in which they were engaged; rather was it due to the necessity for arming them in such a manner that they might beat off the attacks of enemy warships. Too often we were at war with France, who also had an eye for the riches of India. The French did for the British what the latter had often done for the Spanish—i.e. took from them the spoils on their homeward trip.

In addition, the East Indiamen had a considerable passenger list, what with the company's officials and the troops which it was necessary to send out to the East.

Most of the East Indiamen were built at Blackwall on the Thames; here they were equipped and loaded, and thus made this section of the Thames not only a great port, but something of a naval station too.

In those great days of sail there was no hard and fast division between the naval and the mercantile craft, for the simple reason that the ship of commerce must always be ready for a foe, whether an armed merchantman like herself, a privateer, a pirate, or an enemy warship.

Blackwall, the home of countless East Indiamen, was also the home of many of the best warships of the pre-Trafalgar period. Indeed, the builders had often to leave merchant ships on the stocks to turn hurriedly to a strengthening of the navy.

The East Indiamen were anything but fast; they sailed along in a leisurely fashion, and their owners were quite content if they made the round

trip in a twelve month; it was rare indeed for such ships to leave the Thames twice in the same year.

The great ideal was to get a vessel which was immensely strong, with plenty of room in her somewhat lumpy hull.

A typical ship of 1750 would have three masts, fully rigged, a length of 109 feet, beam of 34 feet, and a tonnage of 670. A good deal of money was spent on her adornment. There was an ornate figure-head with plenty of scroll work at the bows and the stern. The company was rich, and these decorations seemed to enhance its prestige; only a prosperous concern could possibly spend so much on such additions to a ship which was as well built as could be. These vessels were not as well designed as they could have been; indeed, there were glaring defects which took years to correct. Although it has been suggested that these fine ships were the property of the East India Company, it was the case that, in practically every instance, the ships were under charter to the company. They took them over as soon as they were in the water, and usually renewed the charter as long as the vessel was seaworthy.

In those wonderful days of sail it was no uncommon occurrence to have twenty East Indiamen at Blackwall; one old print shows them in a single big basin.

As time went on the ships grew larger and larger, and their design was greatly improved, particularly as regards their lines, which had now become those of the pre-clipper type of ship. During the last years of that great struggle with France, which ended with the Battle of Waterloo, many minor

battles were fought on the sea; in these the East Indiamen played their part.

There is one outstanding incident which shows clearly how strongly they were manned, and how well their armament had been chosen.

A fleet of these splendid ships had set out for home from Canton in company, when they were overhauled by a powerful squadron of French naval vessels. There ensued a running fight, which was carried on with such gusto by the British ships, that at length the French commander signalled his squadron to draw off, quite believing that he had encountered a British merchant fleet, convoyed by warships. The warships, as he thought, were the heavily armed East Indiamen, who were indeed acting as convoys for their smaller sisters.

The Frenchman may be forgiven his error, for these big ships were splendidly handled, and their thirty-six guns did great execution amongst the enemy squadron.

This action was fought less than one hundred and thirty years ago, yet what a change has been effected in ships and guns; only the men remain the same.

It was in these East Indiamen that the new beverage which was making its way steadily in Britain was largely brought home, and the smallest of them often sailed with something like 750,000 lbs. of tea in her hold. This will explain why the fleet mentioned above was on its way from Canton.

A curious fact about the East Indiamen of the middle years of the eighteenth century may be noted; it is that whilst many of them reached the tonnage of 499, none exceeded it. Why should they stop short by a single ton of the round 500?

The explanation is quite simple—a ship of 500 tons, or exceeding that figure must, by law, carry a chaplain. Either the East India Company thought their men good enough without a chaplain, or they declined to pay his salary!

To become a captain of an East Indiaman was counted an honour indeed, far greater than the command of one of the greatest liners of to-day. It was difficult to obtain such a post without great influence, but once obtained, a man's fortune was made. He was allowed certain privileges of trade, and he had so many feet of cargo space allotted to him for his own private use. To a man these captains embarked in trade with the East. It is more than probable that they were encouraged to this by their employers who thought that a man having a substantial interest in the ship would be more likely to take good care of her. Then he had, as his own perquisite, the passage money of any officials of the company who voyaged to and from the East.

It was considered that a captain who did not make a large fortune in five round trips to enable him to retire, and live the life of a country gentleman, had done badly indeed. On many occasions a profit of £6,000 was made on a trip out and home, and when it is considered that such a sum had a much greater real value than to-day, it will be seen that the pizes were rich indeed.

There is reason to believe that a great deal of smuggling went on aboard these famous old ships, and that the captains were not averse to sharing in that easy ascent to fortune.

At a time when service in the Royal Navy was none too popular, as witness the mutinies of the eighteenth

century, and the work of the press gangs, that of the East Indiamen was sought after very keenly. There was never any lack of splendid seamen, who were attracted by decent pay, good food, grog, and all the other amenities which make for contented crews. There was the strict training and discipline as found on the King's ships, but there was not the same round of useless work, nor were there other drawbacks which seemed inseparable from the senior service.

The East Indiamen were singularly safe ships, especially at the opening of the nineteenth century, which also marked their last phase. Manned by the crews indicated, they were extremely well built, not for speed, but for rough weather. Their cargoes were so valuable that no risks could be taken, therefore, it was customary to take in sail promptly whenever a change of weather foreshadowed a gale. Regularly each night at sunset certain sails were taken in to be unfurled again when dawn allowed their resumption.

For years the East India Company had a practical monopoly of trade to the East; their position was a most favourable one, and yet their very successes brought their own troubles.

The Home Government were becoming concerned at the immense power wielded by this great corporation, and then there were other shipping firms who regarded with jealous eyes this strict monopoly which debarred them from a share of the trade to China and India. The first effects of this new movement were felt in 1834, at a time when the fleet of the East India Company had reached its zenith. In this year the company lost its China monopoly, and not so long after steam came into

the ocean trade, as it had already made its way in coastwise traffic, and soon the East Indiaman was a relic of the past.

The Indian Mutiny coincided with the rise of many steamship companies; it also marked the last phase of the ship under sail as regards the heavy, lumbering East Indiamen. The clipper ship era had begun, and, whilst still in its prime, was under a dire threat from the rapidly developing steamer.

Another very fine type of sailing ship belongs to the mid-nineteenth century—these were known as the Blackwall frigates. They really began as rivals of the old East Indiamen, but lived to supplant them.

Theirs was a short reign indeed, due, of course, to the advent of steam. At the time the first of the Blackwall frigates was launched—1837—there was no large steamship afloat. In 1875 the last of these frigates was put in service, and the clipper was then the monarch of the sailing ship nation, a monarch threatened with early dethronement.

The *Seringapatam* was the first of these Blackwall frigates, and the *Melbourne* was the last. The latter ship was better known perhaps after re-naming, when she became the famous *Macquarie*.

These were singularly handsome ships, and may be said to have achieved their zenith in the early 'sixties. Their crews carried with them the high traditions of the East Indiamen, and their officers were drawn from the same class as those of the earlier service. Everything aboard was conducted with the same standard of efficiency as on the older craft, and the navy could not show a smarter body of men, nor yet a smarter ship.

To see these splendid vessels start out on their long voyage was a sight not to be easily forgotten.

Their bright paint and brass-work, their few guns on the main deck, and their neat ports, plus well-cared for rigging, gave them a stately appearance.

The prints of the first of this class make them appear as lumpy as the East Indiamen, but the later ships vied with the clippers in their fine lines. Against the latter they frequently engaged in friendly contest, sometimes beating them.

It is a saddening thought that these splendid clippers and barques have nearly all gone. In a recent list there were just four square-rigged ships under the British flag, and possibly there are not that number at the moment. Other countries have more, but steam and the motor have written finis to their career, and the ocean will be emptier and less interesting to the voyager, as well as the seaman, when the last has found the breaker's yard.

These were indeed the great days of sail when clippers raced the Blackwall frigates, when steam had to admit that it could not give the speed of canvas.

We miss the black-coated ships with their broad band of white running the length of the hull, broken at regular intervals by the black ports. Most of all we miss the billowy canvas as it strained and did its work.

CHAPTER III

THE SPLENDID CLIPPERS

THERE can be no doubt that the sailing ship reached its zenith with the development of the clipper. Few types of ships can have had so short a reign, since a century ago the clipper had not arrived, to-day they are almost gone.

The East Indiamen had been considered the finest product of the shipyard, but though very strong and seaworthy, they were slow; something better was needed for the increasing commerce of the world, and it was the Americans who gave the lead.

It is difficult to say exactly which was the first of the clipper ships. Mr. Keble Chatterton, who has written more about sailing ships than most men, advances the claims of the *Rainbow* as the first genuine clipper. This singularly handsome vessel was built in New York in 1845. She at once proved to be the fastest vessel afloat. Her tonnage was only 750, and her life was a short one indeed; three years after her launch she was lost off Cape Horn.

It is usually allowed that the Chinese tea trade was responsible for the development of the clipper; this, however, is only partially true. Before the clippers engaged in the tea trade they were employed in one which was singularly discreditable to the nations who indulged in it. This was the traffic in

opium. Quite rightly the Chinese Government prohibited the importation of this pernicious drug.

But the lure of excessive profit encouraged both British and American owners to undertake the smuggling of opium into the four treaty ports. The opium traffic was actually handled by Chinese, but American and British ships brought the drug to depot ships anchored in the treaty port harbours, receiving silver dollars or bullion in exchange for the stuff which was to do incalculable harm to the native population.

To circumvent the efforts made to stop this illicit trade it was necessary to build very fast ships. Not yet had steam made any progress; here then came the chance of the clipper, and its further development was greatly accelerated by the traffic in opium.

The Americans followed up their success with the *Rainbow* by building the *Sea Witch* in 1846. She at once engaged in the tea trade with China, and her very rapid passages soon brought her many sisters.

British shipping had a decided shock when later it was found that tea cargoes were being discharged in London's river from American-built hulls. Thus did the clipper invade the Thames, and cause our shipbuilders there a rude shock.

Certain navigation laws had operated adversely and they confined British shipbuilding enterprise in definite, but obsolete channels. The monopoly of the East India Company had helped the cloying effect of these laws, and at last it was seen that unless our people woke up in earnest and followed in the steps of their American competitors, British supremacy on the sea would be quickly a thing of the past.

Our people were quick to learn their lesson, and within a year or two Aberdeen-built clippers were running in competition with those from across the Atlantic. The first of the British clippers in the China trade were the *Chrysolite* and the *Stornoway*, but they did not quite equal the remarkable performances set up by the American pioneers. Indeed their best trips were five or six days longer than the *Oriental*, the American clipper against which they were matched.

But our people were now fully aroused, and, in due course, there appeared the *Challenger*, which was a direct answer to the American *Challenge*. There came the inevitable race, and, to the joy of all Britons, the home-built clipper beat the American by two clear days in a trip from Anjer to London.

From this point there was no going back, though for some years the Americans had the advantage in the matter of building, owing to the fact that they had plenty of wood available. The timber employed was of the soft variety, which meant that the ships were comparatively short lived. Britain had to use imported timber; having to buy it abroad it was thought desirable to purchase hard wood. This was a wise decision, because the soft wood clippers showed a distinct slowing in their speed once their timbers were thoroughly soaked.

Another factor helped largely in the development of the fast sailing clipper; this was the discovery of gold in California.

This occurred in the closing years of the first decade of the clipper, and many of them were at once rushed into the passenger carrying trade.

To-day it seems strange to find men from the Eastern States of America voyaging round the stormy

Cape Horn, and up the West Coast of South America, to accomplish a distance which can be done comfortably in a train within a week. But the trans-continental journey was then almost impracticable. True, several made it, many more attempted it, and lost their lives in their enterprise. There were no railways, and the long journey lying through desolate country, open to the attacks of Indians, was extremely dangerous. Therefore it was found better to brave the long ocean voyage, which, for the most part, was made in comfort.

Close upon 100,000 persons reached California by means of the clippers, which were turned out in haste and in great numbers.

The American gold boom was succeeded by one in Australia, and whilst many of the American-built ships shared the passenger carrying trade to the Antipodes, a boom in British building also followed.

The White Star Line, now amongst our most famous steamship companies, began with the clipper. Twenty years before they startled the world of steam with their *Oceanic* they had many fine ships under canvas building up a reputation which stood them in good stead when they switched so completely over to steam.

Perhaps the most noted of their earlier clippers was the *Red Jacket*. This was built in the States, and quickly claimed some valuable records. She crossed the Atlantic in thirteen days, and reached Melbourne from Liverpool in sixty-nine days.

These runs are merely typical of those accomplished by many other fine clippers whose names are now, alas, but a memory.

Nor was the North Atlantic devoid of these ships with their towering masts and billowy canvas.

Between Britain and the States a good deal of the passenger and cargo traffic was carried under sail until the 'sixties, when the liners under steam began to assert themselves in speed and in comfort.

But it was in the China Tea Trade that the clippers were most in the limelight. Year after year they left Britain and waited in the Min River at what was—and is—called the Pagoda Anchorage.

The period of waiting was fully employed in seeing that the ships were made ready for their race home. New ropes were substituted for any which were at all doubtful, and the same applies as regards yards and sails. Decks were kept in spotless condition, brasswork gleamed, and from top-mast to keel the clippers were easily the best conditioned ships of their day, nor are they outshone by the present liner on the crack services.

The tea began to arrive in sampans. Needless to say arrangements had been made in advance as to which ship could carry a certain consignment. The ships were indicated to the men in charge of the sampans by means of certain signs painted upon them, or by certain flags, both easily distinguishable from a distance.

Every nook and cranny of a tea clipper received tea. Even the captain's cabin had to have its quota; sometimes the occupant knew not where to turn, even his bunk had its burden of tea, either under, above, or even upon it.

The work of stowing was done by expert Chinese stevedores, who had brought the art of stowage to a very high pitch; it is safe to say that the fastest clippers never sailed without being as fully loaded as they could be.

It was customary for the best known ships, with reputations already made, to get the first consign-

ments. Often two or three finished loading on the same day, with perhaps less than a couple of hours between them. Then the services of a tug would be requisitioned, and the tow down the Min River commenced.

The year 1866 will always be remembered for its great tea race. In May of that year there was a large fleet of clippers at the Pagoda Anchorage waiting their cargoes. Of the fleet the majority of the clippers had already made their name for speed. Two ships, the *Taitsing* and the *Ariel* had theirs to make.

The *Ariel* got her load first, but she was not so fortunate with her tug, the result being that she was not actually first away.

Eventually three splendid ships got away on practically the same tide, whilst another, the *Fiery Cross*, managed to steal out a day ahead of the favourite and her two immediate rivals.

It was quite the usual thing for the fastest clippers to get away together, and often to keep in company for several days, if not for practically the whole of the distance over which the race extended. In the race of 1866 two of the ships did not get a glimpse of each other until they reached the English Channel, but the other two set out upon a grim race indeed; these were the *Taeping* and *Ariel*, the first an old stager, the *Ariel* a newcomer to the contest. Sometimes they lost sight of each other, but for days on end they raced neck and neck, passing the *Fiery Cross* on the second stage of the contest.

The *Ariel* was especially heavily pressed, and carried away many sails.

At St. Helena there were five contestants with only a few hours between them. When at length

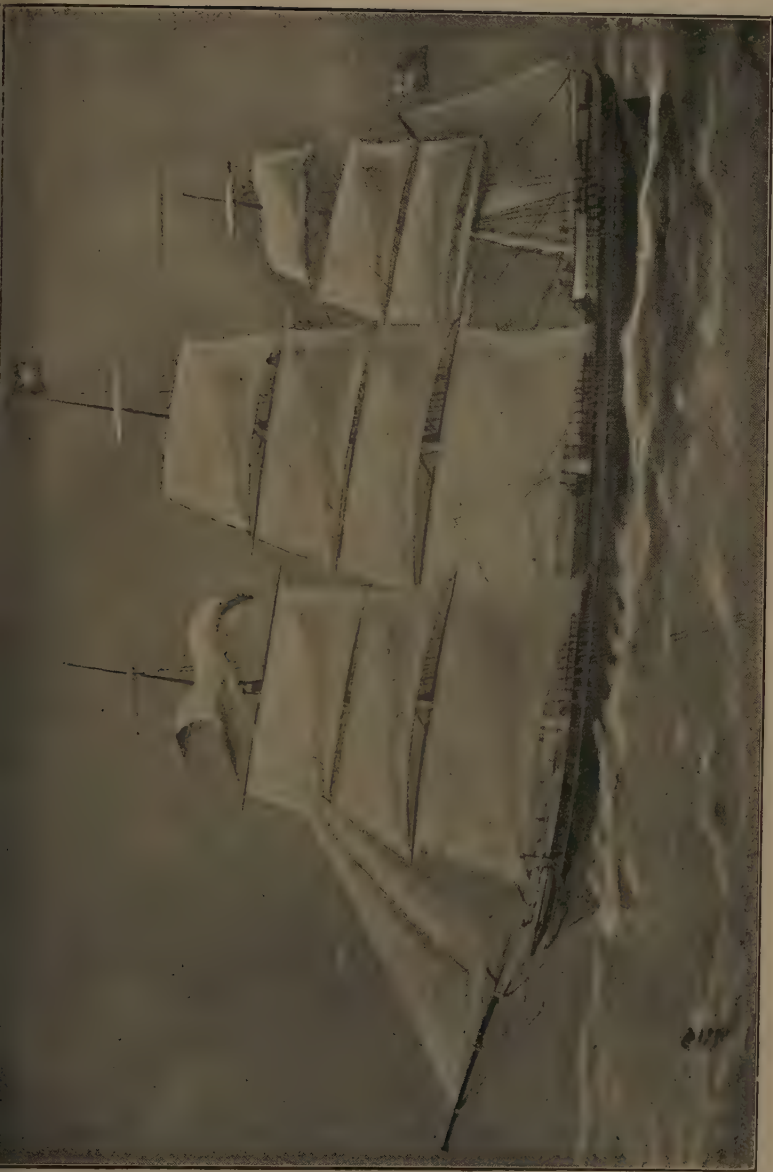
the English Channel was reached, the *Ariel* had forged ahead, her two nearest rivals, the *Fiery Cross* and *Taeping*, being not very far behind. A slice of bad luck in running into a calm soon put the *Fiery Cross* out of the contest, so far as winning the race was concerned. At the same time the *Taeping* managed to draw level with her rival. Now came a ding-dong race up the Channel in which every wile known to the respective captains and crews was employed.

At Dungeness the *Ariel* was a good fourteen knots ahead, and she signalled for her pilot, burning blue lights, night having fallen. On shore this great tea race was followed with all the excitement of a general election. There was no wireless, of course, but as the ships signalled their passing of various points the news was telegraphed over Britain. For the owners the excitement was as intense as for the men aboard. The public were not to be outdone either, and wagers were frequently offered and accepted by the more sporting members of the public.

The first ship to dock took the prize, which was in the form of a premium on the cargo. This was shared by owners, captain, and men.

The *Ariel* was successful in getting her pilot before her rival, but as he boarded her the *Taeping* came up for hers.

Strictly speaking, all sailing ship races might be said to end in the Downs, when the pilot took charge. Often a tug finished their last lap for them, therefore, there was no call for expert seamanship, but, as already mentioned, for the tea race the ship first within the dock gates claimed the honour. By a turn in fortune's wheel the second ship in the Downs was the first in dock, the *Ariel* docking exactly



“Thermopylae”

One of the most celebrated of the Australian clippers. She held the record for the voyage to Melbourne.



“ Herzogin
Cecilie ”
One of the last ocean
sailing ships.

[Nautical Photo Agency]



“ James Baines ” [Nautical Photo Agency]
A famous American-built clipper of the 'fifties.

twenty-three minutes after the *Taeping*. Really the latter could have claimed the whole premium, but when the final stages of the race were entered upon, and the issue promised to be so close, the captains of the leading ships agreed to pool the premium, the ship first landing her tea samples claiming it on behalf of herself and her nearest rival.

The other ships came up in fine style, the *Serica* being only four hours behind the *Ariel* in the Downs. The *Taitsing* and the *Fiery Cross* followed, the latter actually claiming fourth place in this now historic race.

It was indeed a remarkable struggle, proof of good seamanship and magnificent ships. Under steam such a close race would have been remarkable, especially where the steaming capacity of the vessels could have been gauged beforehand. Here, however, the race could only go to the best-managed ship, which had as much luck of the sea as was possible in such conditions.

Of all the clippers few remain in any form; what there are will be found as hulks, their lives nearing their end in a rather ignominious fashion, especially when their first pride of life is remembered.

Chief of those which remain, if not chief amongst the best of the clipper race, is the *Cutty Sark*. Her very name endears her to ship lovers and there are many who think that it has helped her to survive.

A record breaker in her day, she passed, like so many other famous clippers, to foreign hands, finding Portuguese owners. These altered the trim little ship and put her on services for which she had not been designed.

Very fortunately she was brought back to her native land by one of her old skippers, and under

his care has now come to a safe anchorage in the Fal, where she serves as a training ship.

How splendid it would be if she could once more circle our coast under her snowy canvas each summer, and be seen at the ports where those who loved the sailing ship, and the clipper especially, could once more see an example of the really great days of sail.

Another famous clipper was the *Thermopylæ*, possibly the greatest rival the *Cutty Sark* ever had.

The *Thermopylæ* was a most splendid ship in her prime, having a green jacket, the uniform of the famous White Star Line of Aberdeen clippers. Whilst the recorded runs of the *Thermopylæ* are not the highest amongst the race of clippers, there were men who sailed in her who believed that, under proper conditions, there was no faster ship afloat. Above all she was a remarkably dry ship—a fact which is important, for many of the clippers were terribly wet in anything like a gale. In addition, the White Star boat could get along in a breeze which would leave many a ship becalmed.

(The great race of clippers are now but a memory—but what a memory! How many of best captains and officers under steam, most of them now gone from the scene, owed their fine records to the hard training they got aboard these glorious ships. That training helped immensely to make them the best commanders of the small steam liners which they found so entirely different to the ship to which they had grown accustomed. So came the days of steam, and now they too, are threatened, the motor ship may easily oust the steamers as they ousted the clippers.)

CHAPTER IV

THE FIRST STEAMBOATS

MANY hands and brains went to the making of the first steam engine. By the period of Queen Anne it was quite a good servant, though far from being the fine machine which it became when Watt began his improvements in the reign of George the Third. It was at this period that the question of applying steam to ships began to receive a great deal of attention.

Although there were one or two experiments made with steamboats before 1670, no definite progress is recorded, and the later experiments which followed owed little to the earlier pioneers. Watt had now succeeded in bringing the stationary steam engine to a very fair state of perfection; before his experiments with a double-acting cylinder and condenser, a great deal of steam developed by the boiler was wasted in driving the engine. When Watt had made such progress it was suggested to him that now was the time to apply his engine to the haulage of coaches and waggons on land, and the driving of ships on sea. To all these proposals Watt shook his head; he did not say the thing could not be done, but he was far too busy with his own particular work to turn to the building of locomotives or marine engines. The coal pits of his day

were crying out for winding and pumping engines; Watt determined that they should have those engines, and that they should be as good as he could make them.

There was nothing to prevent others attempting what this great engineer declined. In 1783 the Marquis de Jouffroy built a curious steamboat on the river Saone, in France. Frenchmen claim for their marquis that he was the first to show what could be done with two paddle-wheels driven by a steam engine, but though the steamer undoubtedly ran to and fro on this river, it was not quite a success and was withdrawn, not to be heard of again.

Only four years after the Frenchman's experiments began, we find an American, named Fitch, with a steamer on the Delaware River, near Philadelphia. This was quite a small boat, and instead of using paddle-wheels, Fitch employed oars which one writer has described as "malt shovels." Once more, although a definite step forward had been made, the inventor seems to have stayed his hand, and allowed his experiment to stop short of actual usefulness.

Scotland was the pioneer in steamship development of the nations which made up the United Kingdom. First there was Miller, an Edinburgh banker, who had a vessel with two hulls with paddle-wheels between them. These were driven by manpower. Someone said to him "Why not have a steam engine to do the work—it would be better and cheaper?" Miller was quite ready to try the experiment, and later, when an engineer, named Symington, was introduced to him, he asked the latter to make and fit a steam engine. This small steamer was quite a success from the point of view

of showing what could be done, but it was not claimed for it that it was of any great use commercially. That is to say the steamer did not carry people, or cargo, at a profit. But it did make people think about this new form of propulsion for boats.

One of these was Lord Dundas, who was chairman of the Firth of Forth and Clyde Canal. He thought that a steamboat might easily take the place of the horses which towed the barges through the canal.

Symington was commissioned to build a marine engine, and by 1802, the *Charlotte Dundas* was ready. This little craft had a stern paddle-wheel, an arrangement rarely, if ever, seen now in Britain, but quite a common type of propulsion in America. The reason for its popularity across the Atlantic is that it can be fitted to very shallow-draught boats. The water need only be a couple of feet deep for the stern-wheeler; it is possible to enclose the paddle wheel and so protect it from the weeds and other obstructions found in shallow rivers.

When the *Charlotte Dundas* was tried there was great excitement. Although only a mite of a boat, she moved off against a strong wind with two big sloops in tow, each deep laden with 70 tons of cargo. The midget took her load $19\frac{1}{2}$ miles in 6 hours, and thus clearly showed that the steamer, as a tug boat, was really successful.

The *Charlotte Dundas* was never put to work; instead, she was laid up to rot away in a creek, lying just off the canal.

It was found, that, whilst the steamer would save a great deal in towage, it would possibly render the canal useless in a very short time, owing to the wash from her paddle-wheels. Even with a small river steamer the wash is very noticeable.

Rather than take any risks, the canal owners thought it better to keep to the tried and trusty horse. And although the steamer is now often seen on canals, it has never supplanted the horse, and it is hardly likely now that it will.

Scotland was to have a still greater part in the coming of the steamboat, though it did seem that, with the laying up of the *Charlotte Dundas*, steam navigation had come to a standstill. Henry Bell, of Glasgow, had long been certain that the future of ships lay with steam, and he wrote endless letters on the subject, first to our Naval authorities, and then, when he found that they would not take up the question, he tried abroad. Lord Nelson was interested in what Bell had to say, and he was certain that if we did not take up steam for use with naval vessels, some other country would, and that as a result, we should lose our position as the greatest sea power of that day.

Nelson had to fight rather than look after the provision of warships, and before he could return to the question his brilliant career was ended at Trafalgar.

The United States was the only country which seemed interested in what Bell had to say. The Government of that country sent Robert Fulton over to have a talk with him, and find out whether there was anything more to be learnt in this country than America already knew. They went to see Symington, and he showed them the *Charlotte Dundas*. Fulton was greatly interested, and straightway he began experiments, first on the Seine, in France; these he carried further when he got back to the States. He also ordered a steam engine to be made at the famous factory of Boulton and Watt,



"Atlantic"

The first of the four Collins liners which maintained the Stars and Stripes on the Atlantic in the Fifties.

at Birmingham, which was shipped to America, and there fitted to a steamer which made history. This was the *Clermont*, by many writers claimed to be the first really successful steamboat. The story is told that when the *Clermont* first went up the river at night she frightened the poor Dutch farmers so much that they ran into the woods, thinking that the Evil One had come. The *Clermont* was making a fearful noise with its paddles and the escaping steam, whilst the sparks from the wood fire went high into the air, lighting up the surrounding country.

The news of the success of the *Clermont* came to Bell in Scotland, and gave him fresh heart to go on with his projects. At last he was able to build a steamer to run on the Clyde; the little *Comet* was the result. This was in 1812, and from this date there was no looking back in steamship building, though, of course, progress was not very great at first. Indeed, it was some years before the Clyde had any number of steamers, and many more before the steamship was seen on the ocean. The Thames had its steamboats before 1820, and all kinds of advertisements appeared in the papers saying how good was the service. People were told that if they liked to buy their food and cup of tea on board they might, but, should they wish to bring their own particular teapot, hot water was free. They were days of excitement, often the little boats, which had wonderfully long chimneys, would fail to start when all were aboard for a trip up river; sometimes, when started, it was not easy to stop them, and often, too, they would have to be laid up for weeks whilst a new part for their machinery was specially made.

As showing how little was known about the machinery of the first steamboats, there is a story still told on Canadian rivers. On a pioneer steamer a Scotsman was engineer, and either he would not tell the crew anything about the engine and its running, or else they would not be bothered. Upon one occasion, when on a voyage down river, the engineer disappeared. It was time to stop the steamer, the trip being ended, but no one knew how to do it, save the engineer, and he could not be found.

The people who were waiting on the bank for the steamer to come in were surprised to see it turn round, go a little way up stream, then round again, and so on for quite a long time. Meanwhile, on the steamer there was great to do, search was made high and low for the very important engineer. At last he was found having a quiet sleep, roused, and then scolded for leaving them in such a plight. He listened to the captain's grumbles, and then said, in his deliberate Scots way, that "the boat would have stoppit hersel' had ye let the fire oot." Which, of course, was perfectly true, but a thought that had not occurred to the alarmed men aboard this early steamer.

Many of the boilers of the first steamers gave trouble, some blowing up and doing great damage, often with fatal results to the crew.

Except on the smallest boats, like those just mentioned, employed on rivers, the early steamers were sailing ships first, and steamers only as a last resource. The old seamen, bred in sailing vessels, knew all that there was to be known about such ships, and in them they would sail anywhere and under any conditions. They were opposed to the

new method of sending a ship through the water. What the cabmen said in the early days of the motor car was much what the old sea captains said of the steam engine and paddle-wheels. But just as the cabman had to come at last to the taxi, so did the old salts have to have the abomination aboard their ships. But with this difference, they kept the sails as well, whereas the poor cabby had to make the change right over at once. The sea captain was monarch of all he surveyed aboard his ship, and though his owners would insist on the steam engine being fitted, all their entreaties would not make him use it. It was so easy for the machinery to go wrong—and here was the excuse ready to his hand for shipping the paddles, drawing the boiler fire, and proceeding just as he did before. So, for a time, the fight went on between the sea captain and steam.

Then it was found, even by some of the most stern opponents, that the steam engine had its use. To this extent the captain would give way—he would agree to let the engineer get up steam, and take the ship under that force right outside the harbour, then up came the paddle-wheels (which were nearly always arranged to unship and come inboard), the fire would be let out, unless perhaps the voyage was a short one across channel, and the steamer was a sailing ship once more.

There was, however, another fact working in favour of steam—this was competition between rival companies. This was often very strong, and the vessels which made the quickest voyages got the most traffic.

If there were a calm in the channel when the ship got outside Dover harbour it seemed absurd to

unship the paddles, and then wait for a wind, especially if a rival kept his engine at work and so drew ahead. It followed that the next step was that the engine was used in calms as well as for getting in and out of harbour. The old captains grew accustomed to steam and kept the engines at work to help the sails; in addition, new captains were taking the place of the old. These saw the real advantages of steam, which allowed a voyage to be regularly performed within an estimated number of hours. And though, perhaps, their seamanship revolted at the addition of this hissing, trembling giant aboard their trim ships, they saw that it was as useless to oppose its coming as to attempt the sweeping back of the sea with a broom. So steam advanced until, after many years, it completely ousted sails on both small and large ships—the liners having sails until a much later period than the short distance steamers.

By 1819 the steamer was firmly established on rivers, also on the cross-channel services, and quite a number were employed on the coasting traffic. All these meant quite short voyages, but the success of the steam-driven vessel on such services naturally turned the thoughts of the pioneers towards crossing the ocean by the same means. On this question opinion was sharply divided. Many who studied the science of steam and its application to the use of man, were against such proposals. To quote but one opinion—that of Dr. Lardner, whose book on the steam engine was considered to be the last word on his especial study. He declared that to attempt to cross the Atlantic by steam was absurd, and the man who seriously proposed it was verging on madness. Like many wiser men Dr. Lardner

lived to revise his judgment. But there was a good deal to be said for such people as Lardner and their ideas. For instance, the boilers of the first steam engines required a tremendous amount of coal, and it was quite easy to show that the ships of that day could not carry so great a quantity, unless they carried nothing else, and were loaded down to their bulwarks.

CHAPTER V

THE NAVY IN STEAM—EARLY DAYS

ALTHOUGH Nelson saw something of the possibilities of steam for the Navy, the Admiralty could not be won over for many years after this great sailor had met his glorious death at Trafalgar. It is on record that Lord Melville of the Admiralty wrote "the introduction of steam was calculated to strike a fatal blow to the naval supremacy of the Empire." It is true that there were naval steamships a hundred years ago, but they were only small, unarmed vessels, and really intended for use as tugs and despatch vessels.

For many years, although foreign countries had their steam warships built in this country, and were more than satisfied with them, our Admiralty would not admit that a fighting ship should be very different from the fine old oak-built vessels which Nelson led so successfully at Trafalgar.

Right up to the time of the American Civil War—that is in the early 'sixties of the last century—our battleships resembled the *Victory*. There were the same tall sides, with their lines of white, in which square portholes gleamed, the same tall masts, the same blunt nose, and high, square stern. But, by this period, several things were happening which clearly showed that the old wooden walls

were indeed to be reckoned with the past instead of the future. Already the Admiralty had fitted some of the smaller war ships with paddle-wheels and engines which gave some assistance to the big spread of sail carried by these ships. The engine was looked upon merely as an aid, not the driving force of the ship, and so long as paddle-wheels were the only proved method of propelling the ship by steam, there was something to be said for the Admiralty's lack of enterprise. In a fight these paddle-wheels offered a splendid target for the enemy's guns. If the ship depended entirely upon her engines, then a good hit on one of the paddle-wheels would place her at the mercy of the enemy. With sails and masts, their replacement, even in a fight, was not impossible, but it would be difficult to carry spare paddle-wheels, and quite impossible to fit them in the midst of an action. When, however, Brunel proved that not only was a large screw steamship possible, but that it was better to build it of iron, the Admiralty began to make experiments. At first they built steam frigates, the best known of which will go down to history because of her total loss; this was the *Birkenhead*, which, whilst employed as a transport, struck a rock off the African coast. More than 400 persons lost their lives in her foundering, and the discipline of the soldiers, who lined up on deck, and awaited their fate with splendid coolness, was praised everywhere. The *Birkenhead* was a paddle-wheeler, and considered a large ship for her period.

In 1852 the first screw line-of-battleship was launched—this was the *Agamemnon*. Still the Admiralty were not quite convinced that the screw was better than paddle-wheels. To test one type of

propulsion against the other two contests were arranged, though a few years divided them. In the first place the *Rattler*, a screw-propelled sloop of less than a thousand tons, was placed stern on to the paddle-sloop *Alecto*; having been made fast to each other, the signal was given for full speed ahead. Although the ships were fairly equally matched in power and size, the screw-driven ship soon obtained mastery, and gradually pulled her rival along until the paddle-wheeler was going astern at two knots.

In the second case the screw corvette *Niger*, under similar conditions, towed the paddle sloop, *Basilisk* at the same rate as the *Rattler* had done with the *Alecto*. These tests may be said to have decided the Admiralty in favour of the screw. As the latter was under water it had none of the disadvantages of the exposed paddle-wheels, already mentioned as a splendid target.

From that period the screw gained steadily in favour on both warships and merchant vessels, until now very few craft are built with paddles.

Before the American Civil War came the Crimean campaign. Here our wooden battleships suffered considerably from the Russian cannon, and it was realised that their day had passed, so greatly had guns and gunnery progressed. But it was a wonderful fight in the American war which clearly showed the type of warship which must succeed the wooden vessel. This famous fight took place between the *Merrimac* and the *Monitor*. The Confederates had attacked some shipping of the Federals, and it seemed very likely that the *Merrimac*, a 60 gun frigate, would fall into the hands of the enemy. To prevent this, or rather to make her useless if

she were captured, the Federals set her on fire and burned her to the waters' edge. The Confederates got possession of the apparently useless *Merrimac*, and decided to see what could be done with the half-burned ship. After giving her the necessary attention to make her seaworthy a large, rectangular fort was erected on the hull. This was built of good pine and oak, and then it was given two coatings of armour, largely made from railway lines. The plating was carried down two feet below the water-line and then carried upwards, on an inward slope, pierced with port-holes to take a battery of guns. Fitted with a steam engine and a screw the *Merrimac* was ready for sea in the spring of 1862, a quaint, yet rather awesome-looking craft. Nothing like it had been seen before, and she was far more of a floating fort than a steamship.

The *Merrimac* did not have to wait very long for a fight; she encountered two Federal sailing frigates, *Cumberland* and *Congress*. With her iron-protected nose the *Merrimac* charged the *Cumberland*, and, her ram going well home, she sent the frigate to the bottom. Then she turned to the *Congress*, which was plainly no match for this new kind of warship. Not only had the *Merrimac* the great advantage of free movement owing to her engine, but the very few shots of the *Congress* which reached her armour proved quite harmless.

The rectangular craft poured a murderous fire into her opponent, and soon the remaining Federal ship had to withdraw from the contest, which was altogether too one-sided for her.

Such a victory elated the Confederates, who, in other directions were getting the worst of the fighting. But the success of the *Merrimac* was not to be

followed by others; already the Federals had something new in warships to try against her. This was the *Monitor*, which had been built secretly, and was now to surprise the *Merrimac* as greatly as she had surprised those two frigates.

Well known on the early British Railways was a man named Ericsson. He also helped to evolve the screw propeller; now in America he was responsible for the *Monitor*. Though very much smaller than her rival, the *Monitor* was better planned; indeed, whilst the *Merrimac* was really the result of an accident, the *Monitor* represented much thought and some experiment. The newcomer had two very excellent features; first, there was little of her to be seen—just about as much as one sees of a fairly big submarine—and then she had her guns in a turret, which could be turned round quite easily. It will be gathered that, without movement, this new, low-lying craft could sweep a rival with her guns, whilst offering only the smallest mark herself. But, in addition to these advantages she was heavily plated, her sides being encased with armour $4\frac{1}{2}$ inches thick, likewise her deck. The plating was carried well below her water-line, and it was strengthened very considerably by stout wooden sheathing, almost two feet thick.

Before the coming of the *Monitor* it was necessary for a ship to turn round repeatedly to use her full battery of guns; here the turret, heavily armoured, was turned by steam, so that the guns could pour their fire on either side in quick succession. At a pinch, the *Monitor* could have engaged two rivals one on either side, without turning.

In this historic fight honours were fairly even, the advantage, if any, being with the *Monitor*, the



Aeroplane rising from the "New Zealand"

Aeroplane just rising from the platform on the guns of one of the turrets in the British battle cruiser, "New Zealand." This type of fitting was introduced after Jutland for machines which spotted. The battle cruiser in the distance on the left is probably the "Australia."



The Early British Battleship "Alexandra"

She was a fine old vessel of the muzzle-loader days with the masts and sails which were thought necessary before the Navy had accustomed itself to reliance on steam. Face page 40



“ Nelson ”

Annual upkeep of this type is officially stated at £380,020, with indirect personnel charges added £432,960. Cost of guns and turret armour is approximately £3,000,000. Cost of engines, approximately £490,000.



Merrimac breaking off the fight, having suffered more damage from the concentrated fire of the turret ship.

The first *Monitor* gave her name to a very useful class of British warships which were built and employed during the Great War. These modern monitors were on exactly the same principle as their famous ancestor, and they were largely named after British rivers, the *Mersey* being one of the best known of the class.

The result of the fight between the *Monitor* and *Merrimac* urged our Admiralty to build many of the new type of fighting vessels. One expert went so far as to suggest that every line-of-battle ship in service should be cut down to the waterline to be rebuilt as a monitor. As a result of the pressure put upon the Admiralty, who were during these years rather shy of new types of ships, one of the old wooden battleships was cut down, armour plated, and then fitted with no less than four turrets, each of which held two guns, weighing nine tons each. At that time, and indeed for many years after, the power of the gun was usually indicated by its weight; now it is usual to give the diameter of the barrel. The new turret ship was called the *Royal Sovereign*, a favourite name in Naval history, and one borne to-day by a battleship. This reconstruction took place in 1864. In the same year we find the Admiralty building a coast defence ship fitted with turrets and well plated, and a few years later came the *Monarch* and the *Captain*.

The last named ship was lost in a gale, when she capsized and nearly all her gallant men were lost. She was not well designed, and many of the experts thought her four 25-ton guns much too heavy. The

Court of Enquiry found that she had too little free-board.

Other famous ships of this period, all built on the turret principle, were the *Dreadnought*, the *Thunderer* and the *Devastation*, all these names being taken from ships which had done splendid service in the navy when it was fighting for the freedom of the seas.

In these masts for sails were no longer important, but they were given another use—a fighting-top was added, and in this were placed several quick-firing guns. The quick-firing guns aloft made it desirable that not a man should be seen on deck unless it was absolutely necessary; now that steam was universal the main work of the ship was done below decks.

From the time of the duel between the *Monitor* and the *Merrimac* until 1879, very little was known as to how the new types of warships would behave in actual fighting. In that year Peru and Chile came to blows, and another duel took place between two ships built on rather different plans. Although the Birkenhead-built monitor, called the *Huascar*, was believed to be the last word of her type, she had to give in to the *Almirante Cochrane*, mainly because the latter had a better system of gun fire.

From this encounter, though not directly, the next great step forward was taken. Instead of the revolving turret, the barbette was fitted to the warships of the 'eighties. The barbette is like the turret at first glance, but instead of the barbette revolving with its guns, the latter travel round inside on a circular platform. Meanwhile another invention altered the whole course of naval warfare, an invention so deadly that through its use in its

latest form Britain almost lost her command of the sea during the Great War.

This latest weapon of offence was the torpedo. For many years the torpedo was regarded with suspicion by the Navy. In the war between Chile and Peru, one of the monitors was supplied with torpedoes, and she found herself within range of an enemy ship.

Without delay a torpedo was sent out, and when it had travelled half way it began to turn, and soon was actually coming straight back to explode in the hull of the attacking ship! Only by the presence of mind of a young officer, who plunged overboard and turned the torpedo round, was a terrible disaster averted. The captain of the attacking ship was so disgusted with his torpedoes that he had them put ashore, and a landing party buried them in the nearest cemetery.

About the time of this war the British Admiralty considered their type of torpedo was sufficiently reliable, but they felt that a special craft ought to be built to carry and operate them. The result was that a fast vessel, classed as a torpedo boat, was built and fitted with a single torpedo tube. It was quite a small craft, yet it became the ancestress of a large family.

With the advent of torpedo craft the modern era of the warship under steam may be said to have commenced.

There are many experts who think that the next era will be one of motor or electrically driven warships of all kinds. Time will show, but already plans are in existence for both kinds of propulsion.

CHAPTER VI

THE MODERN WARSHIP

No sooner had the first torpedo boat, called appropriately, the *Lightning*, been placed in service in 1877 than every other navy of importance adopted the type. At that time there was no German navy, and the United States and Japan had not thought seriously of big fleets. France was our greatest rival for naval supremacy, with Italy some distance behind, whilst Spain had a fairly good fleet.

To France torpedo craft seemed to offer the best chance of getting on something like level terms with Britain; in a few years the French easily outnumbered us in this type of warship. It therefore seemed best to try to get something which would be bigger and faster than the torpedo boat. The new boats were called "catchers" originally, but later they were classed as torpedo boat destroyers, now called destroyers, though often dubbed T.B.D.s.

These were, in effect, large torpedo boats, having two or more tubes for discharging torpedoes, and they had powerful guns for destroying the torpedo boats. As the destroyers were very much faster than the torpedo boat proper, the latter type became obsolete, but it was many years before it was entirely displaced.

In 1908 there were many torpedo boats in our Navy. In tonnage they had grown from the 27 tons of the *Lightning*, of 1877, to 280, and in speed they had increased from 19 to 26 knots. The first large destroyers, which came out in 1893, were very similar in size and speed to the torpedo boats of 1908. In 1907 was launched a super-destroyer, called the *Swift*, which had a speed of over 40 miles an hour. She was driven by turbines and burned oil, and, indeed, practically the whole of this type of warship has been oil fired since 1906.

The destroyers did splendid work in the Great War. More than any other craft they helped us to victory. Not only were they the dreaded foe of the German submarine, but they acted as convoys for our brave fellows as they went across to France; they crossed the broad Atlantic and other seas, to bring the foodships home, and to see that the big transports with American and Colonial soldiers, were unharmed. Without their constant care the big steamers would have had little chance of reaching port.

Many were lost in their dangerous work, but very rarely were they lost by the victory of the submarine. Working in all weathers, at great speeds when on their own duties as compared with convoy, they met a fate which was spared bigger and slower warships. On one occasion two destroyers were involved in disaster, and each lost half its length; these halves were brought to port, and it was wondered what could be done with them. "I know," suggested an expert, "let us join them together as one part is the stem and the other part the stern." Strange to say this was done, the remains of the two destroyers, originally named the *Zulu* and the

Nubian respectively, became a new boat, called the *Zubian*.

These greyhounds of the navy are now classified usually by the initial letter of their names in a similar manner to liners. Thus, in most cases, all ships built to a certain design will have names commencing with "V" and "W", this class came out in the later war years, and there is the "S" class, and so on. The Admiralty appear to have worked through the alphabet to Z, and are now thinking of beginning again. The "V" class is very popular. They have as many as six tubes for firing torpedoes, many powerful guns, and they have a speed of well over 30 knots, their engines being equal in power to those of a big liner. Difficult ships to catch they would prove stern fighters when cornered, but one good shot from the heavy guns of a battleship would send them to the bottom, since they have no protection in the shape of armour. A destroyer must always be on the run against a heavier craft.

In the latest destroyers—and in many larger ships too—the unequal pair of funnels is at once observable. Whilst one is long and thin, the other will usually be short, with quite a big diameter.

The destroyers are splendidly named too, the names seeming to fit the type of ship. Thus, *Tomahawk*, *Torch*, *Tuscan*, *Wanderer*, *Witch*, *Scout*, *Seawolf* and *Steadfast*.

Destroyers are grouped in flotillas for fleet and active service; they have their own flagships, or leaders, and before the war the leader was often a big destroyer. The war, however, taught many things, and one of them was that an entirely new kind of ship was needed to lead the destroyers—

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thus we got the flotilla leaders. There were two especial reasons why a larger craft was necessary to act as a flotilla leader. First, there was the need of greater accommodation for the staff of the senior officer; secondly, there was the need of a ship which would be able to take charge of her little family, and defend them against something bigger than themselves; hence the flotilla leader. One of the first of the new class was named *Nimrod*, and she was one of the last four funnelled warships to be built. This class came out early in the war, and they were so useful, so fast, and so well armed that they were, in effect, light cruisers.

There are a good number of flotilla leaders now afloat, and they really are to the present destroyer, what the first destroyers were to the torpedo boats of their day.

Another new type of warship which the war brought along is the Patrol Boat, usually called the "P" boats. They have no names, but go by numbers, thus "P 31." Not having the great turn of speed of the destroyers, the Patrol boats are intended to patrol the coast, to hunt submarines, and to act as convoys. In one sense they may be said to be a development of the old torpedo boat, since they carry torpedo tubes and small guns. In the war the pioneer class, which numbered almost fifty, did fine work. They lie so low in the water, and have so shallow a draught, that they were frequently mistaken for submarines; doubtless at times they were hunted as such boats by our own craft. They have what few warships now possess—a steel ram, so it would go hard with anything that lay in their path.

During the war the German submarines came to dread these patrol boats, since not only did a torpedo

pass under their keels, owing to their light draught, but the patrol boats carried depth charges, which they used with great effect on the luckless "U" boat. The result was they kept below when the patrol boat was sighted. But a submarine which ran away one day was ready for an attack the next, and the especial business of the navy was to destroy these raiders. But how could it be done when they kept below and refrained from attacking a convoy when there were plenty of destroyers or patrol boats circling it? That was the question to be faced, and the answer to it was one of the most remarkable warships ever seen. These were classed as "Q" ships. Many wonderful stories were told of their exploits, and doubtless they did not shrink in the telling!

Certainly the adventures of the "Q" boats were thrilling. Instead of trying to get away from the submarines, they were to invite attack. Built to resemble in every respect a steady going merchant vessel, they nevertheless had a system of quick change which made them a warship in almost the twinkling of an eye. Dummy bulwarks would drop down, guns would be exposed, and the submarine crew had a severe shock. Thinking it had a merchant ship at its mercy the submarine would come to the surface, and go leisurely about the business of sinking the ship. The crew of the "Q" ship—or rather a part of it—had to take to the boats, whilst those left aboard were made ready for the submarine. Sometimes the submarine was wary and fired its torpedo before the "Q" boat was ready. Even then there was just a chance that the weapon would travel under the shallow draught "Q" boat.

The Germans soon began to regard every ship with untrusting eyes, and they would try to loose their torpedo before the "Q" boat had an inkling of the fact that a submarine was near.

Our men then found another method of dealing with the German "U" boat. A convoy would be sent along either without protectors, or with only a fraction of what there should have been. But mixed in with the merchant ships proper were some of the improved "Q" boats. As a rule these hung a little behind or steamed a little wide. Up would come the submarine, the commander deciding to sink the outermost vessel, then quickly submerge, and still follow this apparently unprotected fleet. So a torpedo would be seen bubbling its way along towards the "Q" boat. Men were alert upon her, and before the torpedo reached her she would spin round and either charge head on to the submarine, or follow her with depth charges.

In the Navy, during the war, the motor-driven craft played a great part, and none did so well as the coastal motor boats, which Messrs. Thornycroft put in service for the Admiralty. These puny looking little fellows did some marvellous work. Their speed was nearly 30 knots, a draught was given which allowed them to travel on the shallowest water, and they had crews which took all kinds of risks, hesitating at nothing. Besides taking the place of the smallest torpedo boats of the pre-war period, the coastal motor boats did very good work in ways which even their designers had not considered. The attacks on Zeebrugge were shared by these boats, and though some were hit, in most cases they came out safely because their diminutive size and high speed made them a difficult mark for

the German gunners. In other directions, such as mine-laying, depth charge dropping during submarine hunts, and in making smoke screens so that other ships could operate, the coastal motor boats played a splendid part.

The motor launches were an entirely different type of boat, but doing much the same work as those just described. Nearly 600 of these were built during the war in Canada and the United States. Armed with a 3-pounder gun, and having a speed of 19 knots, they did excellent service, and they were able to keep the sea in weather which would have sent the coastal motor boat home—or to the bottom.

In the British Navy the earliest types of submarines were very small, and were known as the A, B, C and D classes, the latter a great improvement on the first three. Then came the "E" class of boats which were very successful, and though they have now been surpassed by many new classes, they did very well in the Great War. But what a terrible price they paid! Out of 50 more than half were lost! Against the 9 men required for the "A" class of submarine, the "E" class requires 30. Of the more modern types the "K" class are very big boats and they were the fastest sea-going submarines built until quite recent years. When running on the surface they use steam for their engines. They have funnels, too, and a clipper stem, with a curiously shaped fore-part which reminds one of a whale.

The "L" class is entirely different to the "K" and is really an improved "H." They are long-distance boats and have done good work. The "M" class mounts a very big gun which can be

fired above or below water, so that this is a very dangerous type of submarine. Then there are the newest submarines, really small cruisers, bearing names instead of numbers. In these all the lessons learned in the war are embodied. The *Oberon* is a typical vessel of the super-submarine class.

An ominous ship is the mine-layer—that mother which lays such terrible steel eggs for another vessel to strike and explode.

To those who like fair fighting, the idea of mines is very distasteful, since a neutral liner may be blown to pieces and women and children killed. One of the best known mine-layers in the British Navy is the former Canadian Pacific liner, the *Princess Margaret*, a fine looking ship with three raking funnels. Mine-layers have their opposites in mine-sweepers. Most of the sweeping was done by trawlers during the war, but there are now special classes for this dangerous work. The sweeper has but to touch the mine for which she seeks, and her minutes are numbered. Many of our paddle pleasure steamers did mine sweeping, too, in the war, and they were very successful as their light draught enabled them to pass over mines.

In the old days of sail a favourite type of small warship was the sloop, and when at last it was decided that steam should be tried for warships, it was the sloop class upon which many experiments were made with the new driving force. Now, to-day, we find the sloop equipped with steadying sails—almost the only warship to possess canvas. The sloops are very useful for foreign service, as they can weather storms and also provide comfortable quarters for officers and crew. In hot climates the sloop equipped with sails is deservedly popular,

since, when cruising, the use of canvas lessens the work in the boiler rooms.

Smaller than the sloop, but also an outcome of pre-steam days, is the gunboat, which may be of the shallow draught river type, with twin screws placed in tunnels, or of a larger type to serve on foreign stations. With the sloops, the sea-going gunboats are useful for watching the African coasts to check slave running ships. Many of the river gunboats are employed in Chinese rivers, and it is usual to send them out in sections, and then re-erect them. Similar vessels have also been sent out in sections to the great African lakes.

Perhaps the most curious looking ships in the Navy are the aircraft carriers. There is the *Argus* for example. She was converted from a liner to a mother ship for air-craft during the war, and looks very strange without funnels or masts. Her smoke and hot gases are expelled through openings in the side of the hull. No less than 20 aeroplanes can be stowed aboard the *Argus*, and by means of lifts they can be taken below from the landing platform. Other aircraft carriers are the *Pegasus*, *Hermes* and *Eagle*, but these have funnels in the centre, and the landing deck is therefore divided into fore and aft sections. Whilst it may be a little more difficult to land, there is the advantage of another deck should one be bombed.

The monitor is really a moving fort, its class name derived from the famous Federal ship of the 'sixties. The *Erebus* and *Terror* were monitors of the Great War, taking the names of two warships which went so gallantly to the Arctic during the early part of the nineteenth century. The monitors bearing the names of these historical vessels were

attached to the Dover Patrol, and were many times attacked, especially by submarines. The fact that they survived shows that the special method of protection employed for their hulls was very effective. Naval men know the bulges on the hull as "blisters." These "blisters" were very effective on all the ships to which they were fitted, and are now standard. A torpedo would strike a "blister," and the charge it carried would be expended upon it, not on the inner skin of the ship; rarely was this seriously damaged. Other well known monitors were the *Marshal Soult* and the *Marshal Ney*, the latter not very successful, and having a short life as warship.

The monitors carry the largest type of gun in use, and, having a very shallow draught, they can get close inshore or proceed up rivers.

In the days of the wooden walls, the cruiser was a fast-sailing ship built to protect merchantmen; often they were termed frigates, and so right through the story of the Navy the cruiser has been built to protect the mercantile marine. But, in later years, the cruiser has developed remarkably, until, after a classification which allotted them as first, second, and third class, they became known as cruisers and light cruisers, with very little to choose between the two classes when of large tonnage.

A typical light cruiser is round about 4,000 tons.

Such craft are fairly cheap to construct, and by many experts it is thought a better policy to have a plentiful supply of cheap, speedy boats rather than a few very powerful cruisers or battleships which offer such a ready target to the submarine, or even aircraft. On the other hand, the restrictions imposed by the Washington compact may result in the large cruiser becoming predominant.

The cruiser is usually a shapely-looking craft, with speed written in every line of her.

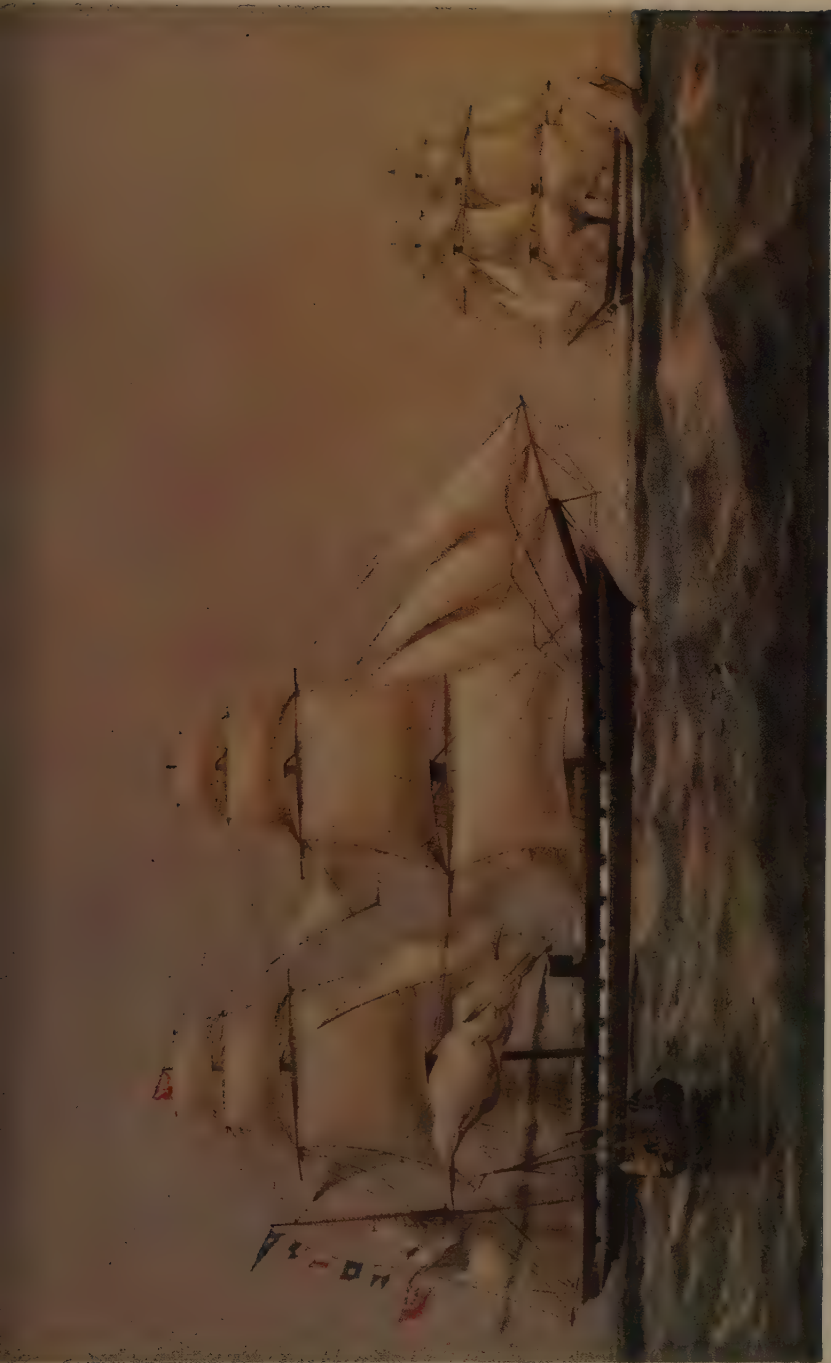
The big cruisers may be said to have begun with the four-funnelled *Powerful* and *Terrible*, which were new at the time of the Boer War. It was the guns of the *Powerful* which were sent up country for use against our late enemies in Natal. The *Powerful* is now one of the ships that go to form the *Impregnable* establishment of Devonport for the training of boys intended for the Navy.

Within recent years many cruisers have been named after our counties and towns. The new 10,000, ton cruisers are taking county names. The *Suffolk* is a typical ship of the new class, which is a singularly handsome one.

The *Hampshire* in which Lord Kitchener was lost, was one of the old "County" class. Of the "Town" class one of the first and most famous was the *Birmingham*, which had the honour of sinking the first German submarine. Another, the *Sydney*, sank that noted raider the *Emden*.

It is usual for the cities and counties, after which these cruisers are named, to keep very closely in touch with them, presenting them with flags, service of plate, and usually, cups for competition. Thus the people of Coventry take a very great interest in the cruiser named after this very inland city, probably farther from the sea than any great town in this country. As some of the guns of the *Coventry* were made in the city from which she took her name, the citizens have an additional interest.

Another very fine class, which was building when the war ended, is the "Hawkins" type of big fast cruiser. One of the class, the *Raleigh*, was lost off the Labrador coast in 1922.



"Cræsus"

A beautifully modelled auxiliary of 1853 which came to grief while acting as a transport to the Crimea three years later.

The battle-cruiser is best described as being a battleship as regards guns, but a cruiser as regards speed. This quite modern class of ship began to appear in 1907, but the class name was not coined until four years later. On one of the first our present King went out to Canada. To everyone's surprise, except those who were in the secret, the *Indomitable* actually surpassed the speed of the famous *Mauretania*, but it was at a terrific coal cost. Coming back the King went down the stokehold, and took a turn with the shovel. Other well known battle-cruisers were the *Lion* (Beatty's flag-ship) and the *Tiger*.

The *Australia*, another big battle-cruiser, when struck off the Navy list was towed out to sea and then, with her sea cocks open, allowed to sink—a fitting end to an historic warship. Thus Australia honoured her part of the Washington Treaty. In the latter the great nations agreed to keep their fleets within certain definite standards of tonnage.

Britain agreed to reduce her fleet considerably, and it is for that reason that so many of our famous ships of the war period have been sold to the breaker up. The *Repulse* and *Renown* are two other famous battle-cruisers, which were originally designed as battleships. They were on the stocks in the early days of the war, and it was thought desirable, in the light of experience gained in war conditions, to alter them completely. The *Renown* has carried the Prince of Wales and the Duke and Duchess of York upon their Empire missions.

The *Hood* is sometimes spoken of as the mystery ship of the Navy. She is really an enlarged edition of previous battle-cruisers, but much faster, having a sea speed of 31 knots, which is considerably above that of any liner.

At the head of all fleet lists comes the battleship.

In 1905 the press was full of the new *Dreadnought*. Never had such a ship been built, and indeed, it did seem that the last word in battleships had been said, and that last word by the greatest naval power. But there is no marking time with warships.

Either a country must get on, or lag painfully behind. And once behind there is small chance of catching up the nearest competitor. The *Dreadnought* made all battleships quite out of date. But, within a very few years came the super-Dreadnoughts, such as the *St. Vincent* and the *Orion*, making the *Dreadnought* obsolete.

Already most of these super-Dreadnoughts have reached the scrap heap. The *Thunderer*, built in 1910, is noteworthy as being most probably the last big warship to be built on the Thames.

Belonging to the war period are the *Queen Elizabeth* class, comprising such fine vessels as the *Malaya*, *Barham*, *Warspite* and *Valiant*. They all took part in the heavy fighting of the Great War, and though there are later battleships, such as the *Royal Oak* class, the five just named are preferred by many naval men, especially as they have been so well tested by actual fighting. Finally comes the new "Admiral" class with the *Nelson* as the pioneer ship.



“ Albión ”
T.S.S. Turbine yacht.



“ Asrangi ”
Canadian-Australian Mail Line. Motor driven.



" Crested Eagle "

Paddle-steamer. London to Margate Service. Passenger accommodation 1,800.



S.S. " Anglia "

Holyhead—Kingstown Service. L.M.S. Railway

CHAPTER VII

COASTWISE STEAMERS

JUST about a hundred years ago the thoughts of the owners of the fine little sailing ships which left the Thames for Leith (the port of Edinburgh), were turning towards steam as an aid to sails.

There were no railways then between Scotland and England, and on land the coach journey was very wearisome, when it was not actually dangerous.

Imagine passengers on the top of a coach for practically forty-eight hours on end—with a few descents when horses were changed, and brief dashes into the inns for refreshment. In the summer it was not so bad, though decidedly dusty, and very uncomfortable when one tried to sleep on the hard seat of a swaying coach. The first-class passengers inside were rather better off, especially in winter, when the outside people were in a pitiable state. Except those who were bound to travel without break, most of the folk who had to go to Scotland occupied a few days on their journey. But this was very expensive, and often the roadside hotels were extremely uncomfortable. The result was that quite a number of people went the whole distance by the sailing brigs, which departed at regular intervals from London Bridge. They were fine little ships, able to withstand the heaviest gales,

and to make good progress when the wind was only a mere capful. But there were calms when they were helpless for days together, therefore, the coming of steam made an especial appeal to the owners of such craft. The steamship was therefore in service on this route long before it was realised that the new force would be used for all ocean traffic.

From the small coastwise steamers of the 'twenties of the last century, we have the 1,000 to 2,000 tonners of to-day. Many a weary business man, who cannot afford a real holiday, is glad to snatch a day or two to go to Scotland on business by these coastal steamers; which are really miniature liners. Some of them go right round Britain, but generally they go no farther north on the East Coast than Leith, and on the West than the Clyde. But it is possible to see most of our beautiful coast-line by using these hardy ships; Ireland, too, is linked with us by the same means.

The General Steam Navigation Company, whose vessels may be found in practically every Continental port, really sprang from the services between Leith and London just described. The fleet consists of many large ships now, most of them far bigger than the first Atlantic liners.

Then there is the Carron Company, who, from the very first, saw the great possibilities of steam. They, too, have services between the Forth and London. Their best steamers are about 2,000 tons, and they have a speed of 17 knots, which is that of the average liner.

The Clyde Shipping Company has its headquarters at Glasgow, whence services are given right round the West Coast of England, through the Channel, with calls at such important harbours as Plymouth,

Portsmouth and Dover, with their terminal port at London. Other steamers go to Irish ports, so that it will be seen that, with very little trouble, a passenger may visit every British port of interest.

The cabins of coastwise steamers are very comfortable, the food is good, and although there may be travellers who crave for the luxury of an Atlantic flyer, most would be more than content with the homeliness of these miniature liners.

For the average pleasure steamer, such as may be seen at any seaside resort, the favourite type is the old-fashioned paddle-wheeler.

These are always graceful, sometimes having the dignity of two funnels, but more often a single funnel, with a pleasing rake, which combines well with the slight rake of the paddle-boxes.

A picture of the fast sailing ship of years ago will show the masts slightly inclined from the vertical, this inclination towards the stern of the ship. It not only improved the appearance of the ship, but there was less strain on the masts. When steam began to make its way the funnels were given a slight rake for the same reasons. This rake is nearly always found in a liner's funnels, often in other ships, but rarely in the tramp steamer, nor is it usually found in warships.

The paddle-wheeler is seen at its best on the Solent and the Clyde; though on the latter river its place is being rapidly raken by the swift turbine-driven screw steamer.

To serve the Isle of Wight there are two distinct fleets of handsome paddle-wheelers. The fleet centred on Southampton runs to Cowes, Ryde and Portsmouth; the other fleet belongs to the Southern Railway Company. The fine boats of the Southern

run to and fro across Spithead to take passengers from the railway station at Portsmouth Harbour to the long pier at Ryde, which has not only a promenade but a railway and an electric tramway. Sometimes the largest of these railway steamers circle the Isle of Wight—a fine trip of over sixty miles.

The paddle-wheelers on the Clyde are rather larger than those seen in the south of England, and they are faster too. It was on the Clyde that the first turbine pleasure steamers were put in service.

One of the biggest paddle-steamers ever built was employed on the Isle of Man—Liverpool services, and she was named the *Empress Queen*. With many more pleasure steamers she joined up in the Great War, but whilst most of the paddle-wheelers were used for mine laying, or mine sweeping, the *Empress Queen* was employed to take troops to and from France. One dark night on her way home she ran on a ledge of rock off the Isle of Wight. Fortunately, although she struck hard on the ledge, the sea was calm and all the gallant men aboard were rescued. But the poor *Empress* was immovable, and there she had to stay throughout the rest of the war. Then the ship-breakers came along, and took her away in bits—all but a small portion which still shows its rusty head when the tide is low off Bembridge.

The “Eagle” fleet running between London and Margate has many fine paddle-wheelers, the largest of which, *Crested Eagle*, is comparatively new.

Perhaps the best known of all the coastwise steamers are those belonging to our railways. Though classed as coastwise they are more correctly termed cross-channel steamers. These vessels are liners

in miniature, particularly those employed between Harwich and Belgium, and those running to Ireland.

The steamers of the London, Midland and Scottish Railway, which ply between Holyhead and Kingstown, are possibly more like liners than any other cross-channel vessels.

They have a speed equal to the best of the Atlantic flyers, and in build and accommodation they are far beyond what the liners were sixty years ago. The names of the principal London, Midland and Scottish Irish steamers are *Cambria*, *Anglia*, *Hibernia* and *Scotia*; these are all new ships since the war, taking the places of four bearing similar names which went on service, some of whom were lost.

The same railway has some almost equally fine steamers running to Belfast, the Isle of Man, and other ports.

The Great Western Railway has a fleet of steamers which serve Ireland, from the new port of Fishguard, and others give fine services to the Channel Islands from Weymouth. The Southern Railway has many steamers for connecting their train services with the French railways. One of them, the *Onward* had to be sunk to save her from total destruction from fire. Unfortunately, she did not settle down on an even keel and she was also badly damaged. After the war she was raised and brought to the Thames for the purpose of refit, a tangled mass of rusty iron and battered machinery. It really seemed that the only thing to be done was to cut up the *Onward* for scrap. But the ship repairers thought otherwise, and she was sent out as good as ever.

The London and North Eastern Railway have a big fleet, too, but their boats have to do longer distances than those already mentioned; therefore they

are rather bigger. Services are given to many Continental ports starting from Hull, Goole, Grimsby and Harwich.

All these cross-channel ships are fine sea boats, and it is rare indeed that they are unable to make their due sailings.



"Hindostan"

P. & O. liner built in 1842 for the Indian end of the Overland Service, later converted into a sailing ship.

CHAPTER VIII

THE SMALLER STEAMSHIPS

ALTHOUGH the big lakes of North America look quite close together on the maps, some of them are many miles apart, and through traffic would be impossible were it not that canals have been cut to link them up. It is probable that these connecting canals have more steamers through each of them than any similar stretch of water in the whole world. Unfortunately, for about half the year the canals, and a great part of the lakes, are closed by ice; even so, the canal which joins Lake Huron to Lake Superior has seven times as much traffic through it in six months as the Suez Canal in a year. By means of the lake-connecting canals it is possible to board a steamer at London, and alight at Chicago, or at the head of Lake Superior. The steamers using the canals and lakes are much broader in the beam than those on this side of the Atlantic; this means great cargo capacity, and it also means that they are very steady.

Violent gales ravage the lakes, and the wind and the waves are very trying. Lake Superior is a good deal bigger than Wales, it is longer than the distance between Dover and Edinburgh, and as wide as the distance between London and Crewe, and is therefore a big inland sea.

This means that the lake steamers have to be as well built as an ocean-going liner, or tramp; many of them are, indeed, liners of the highest class, and although not giants, they are nevertheless large vessels. Many of them reach 400 feet in length, have a tonnage of 5,000 tons, with a speed of 22 knots. On the best of them no third class passengers are carried, only a few second, but from 400 to 500 first. Some have trips—circular or straight out and return—amounting to 1,500 miles, which is more than half the distance across the Atlantic.

Some of these fresh water liners have a distinctly British look, quite different to the American built craft; they were actually built on this side of the "herring pond." Whilst in some cases the liners have managed to get through the connecting canals from the sea entire, others have had to be built in two sections, so that on reaching America they can be put into dry dock and divided. The two halves have then been towed through the canal, floated into dry dock on reaching the lake, and then joined together again; only an expert could say where the joint was made.

It is remarkable that British built steamers can make that long journey, go through the dissection and joining up, and yet compete with the numerous shipbuilders established on the lakes. Wages are, however, less here and this means that materials will also be cheaper.

The freighters, as the cargo ships are called, are built on the spot, and our American cousins have brought the building of these ships to a fine art. In less than three months from the day a freighter of, say, 11,000 tons is ordered, she will be delivered. This is made possible by having standard sizes,

and assembling the parts from various shops, just in the same way that standardised cars are made quickly and cheaply. On one occasion in order to see exactly how quickly a freighter could be at work, only forty days were taken from laying the keel plates until she was in service.

Some of these big freighters will carry 14,000 tons of cargo, usually consisting of ore, and so splendid are the docking arrangements that 10,000 tons will be placed on board in a couple of hours, and off the ship will go.

Those hardy little fellows, the steam trawlers, are fine boats of small tonnage, and exceptionally seaworthy. Not so many years ago the trawlers were all sailing vessels, and the toll the sea took of them was terrible. A sudden storm would arise, and possibly find them quite unready, with trawls down. It was a case of "cut and run," but too often there was not time. So, if ever steam was welcome anywhere, it is in the fishing fleets. Not only are conditions made safer for those hardy fishermen, but we get our fish supplies regularly, the carriers being quite independent of the state of the wind. And the fleets can go much farther to sea. The sailing smacks were splendid vessels, and they were magnificently handled, yet, in one great gale, over 200 men were drowned!

Before the steam trawler was introduced a fast sailing smack would be selected to act as carrier; later it was found that a steam-driven vessel not only saved a great deal of time, but the fish were delivered in a much better condition.

The success of the carrier suggested steam for the use of the fishing boat proper. It was thought best to try converting a tug to a trawler, and, as

the paddle-wheel tug was giving place to the screw-driven boat, it was a paddle-wheeler that was first converted to a fishing vessel. For a short time the work of the three or four tugs, which followed the first to the fishing grounds was watched, and later the whole of the fishing fleets went over to steam, until a trawler of the old type, with its beautiful sails and graceful hull, became the exception rather than the rule.

The new type of vessel, however we may regret the passing of the old, was a great improvement, and it is rare indeed for a present day steam trawler to be lost at sea through bad weather. They can go anywhere, and weather a storm that a hundred years ago would have driven any vessel then afloat to shelter—if not worse.

During the war our trawlers joined up, and it was astonishing the things they did and the trips they made. The bulk of the mine sweeping was done by them and their crews. These brave fellows turned to the catching of those terrible iron fish—the mines—as coolly as they had let down a trawl before the outbreak of war. Very many paid with their ships and their lives when a mine was touched, and they were specially looked out for by the German submarine. A friend of the writer's was a wireless man aboard a steam trawler employed on mine sweeping. His admiration of the fishermen and their work during these trying days knew no bounds. The escapes and adventures of this one boat would fill many pages, and nothing but the coolness and readiness of its skipper saved them from being blown sky-high on many occasions. Once they actually crashed on to a mine and ought to have gone aloft, but, for once in a way, this German mine was harmless.

The application of steam to the trawler brought another great change—the method of trawling was vastly improved in comparison with the clumsy apparatus of the past.

The otter trawl was invented; this might be described as a net with a mouth which is kept open by the regular and steady speed at which the trawler is driven.

Where the first steam trawlers measured less than 100 feet in length, many now approach 200, and the tendency is to make the boats both bigger and stronger in every way, since they have to go farther afield for their fishing. Trawlers from Hull and Grimsby (which between them own more than a thousand steam trawlers), are seen in the once dreaded Bay of Biscay, off Iceland, Northern Africa, Northern Russia and Greenland.

An international agreement has been made that the waters within a three mile limit of a coast should not be fished save by the boats of the country owning the coast. So, in all territorial waters, there are warships to watch for foreigners who break this rule.

Steam trawlers usually go to sea for as long as their coal will last, usually about six weeks if the weather conditions are good. Each day a carrier boat is sent off to the markets, with as much fish as it can collect from the trawlers.

The biggest steam trawlers are remarkable boats, not only for their sea-going fitness, but also for their machinery.

Apart from accommodation for fifteen men and plenty of bunker space, there are usually three fair-sized rooms known as the store, ice and fish-rooms.

It is remarkable to find sea-going craft built at an inland town which has no claim to be called a port. Quite a number of the best trawlers are built at the quiet Yorkshire town of Selby. It is true that, judged by the size of an ordinary liner, or even tramp steamer, the steam trawler is small, but on the stocks a hull of 300 tons looks far too big to go into the Ouse, by no means a big stream at Selby.

Another type of small steam vessel, with a very different life to the trawler, is the yacht. Whilst the latter is the person of leisure in the steamship world, the trawler is the hard worker, with never an hour to spare.

The steam yacht is the most graceful of the whole family of steamships, with her fine lines, smart paint and brightly polished brass work.

The first Royal steam yacht was the *Fairy*, built for Queen Victoria about eighty years ago. There were not many steamships at that period, and the *Fairy* must certainly have been one of the earliest steam yachts. Much better known was the fine paddle-wheeler, the *Victoria and Albert*, which was broken up soon after Queen Victoria's death.

The present *Victoria and Albert* is a splendid looking screw steamer, with all the lines of a yacht and the size of a small liner. In 1908 the turbine driven *Alexandra* was built; she was much smaller and speedier than her larger sister.

Perhaps the best known steam yacht is the *Sunbeam*, in which Lord and Lady Brassey made voyages round the world which have become historic.

To see all kinds of yachts a visit should be paid to the Isle of Wight in the summer. Along that wonderful little river, the Medina, which enters the Solent at Cowes, are many yacht-building and

repairing establishments. In the spring all kinds of pleasure steamers, most of them yachts, are hauled high and dry on the slips, having the usual overhaul before being used for the summer. Then in July, and particularly in August, they are riding at anchor just off Cowes, waiting perhaps for the famous regatta in the first week of August, before they begin their round of visits to the harbours of our beautiful coast, some of them going farther still to the Mediterranean for the late autumn.

Tugs are the handy men of the ship world, attending to the sailing and steam ship alike, bringing them into harbour, taking them out, shepherding them to the dry or floating dock, and finally taking them on their last journey to the breaker up. The tug is rather more than a century old, the first being the *Majestic*, built in 1816. In that year it is on record that this tug was employed towing East Indiamen up and down the reaches of the Thames which lie below Woolwich.

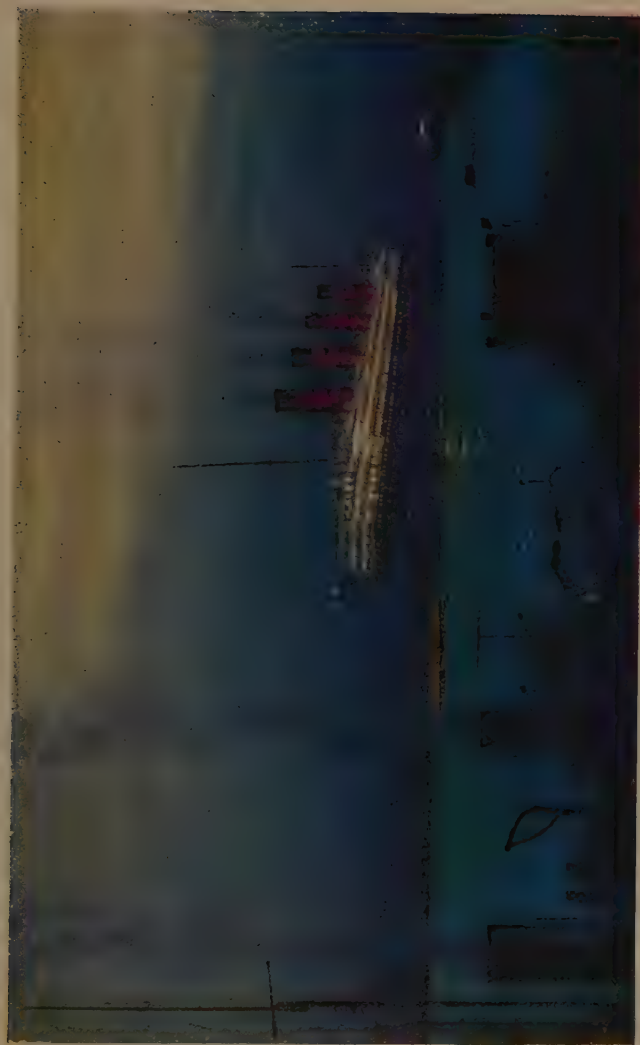
It seemed, after a wonderful period of usefulness in towing the sailing ship in and out of harbour, often going long distances to sea, that the days of the tug were numbered with those of the fast disappearing "wind-jammer." Steamers of small and moderate size were able to get in and out of dock quite well without the services of the fussy little fellow, who lay in wait on the off-chance of a tow. But the huge modern liner is only too glad of the help, not of a single tug, but of several, and whilst the sailing ship may become obsolete, there are still many craft which need their help. It has often been necessary for the tug to be called upon to tow the lifeboat out to the scene of a wreck, and there wait in the howling gale whilst a rescue is attempted.

Then many a steamer breaks down and sends out a wireless call for a tug. The message will reach her somehow, and off she will go, be the state of the weather what it may.

A couple of tugs took a huge floating dock right from our East Coast, round the dreaded Cape Horn, to the west coast of South America, and returned safely after many adventures. It is rather wonderful that so small a vessel as the tug should cross the Atlantic at all, but to take a huge floating dock in tow and deliver it safely, often passing through the most trying weather conditions, is an eloquent testimony to their sea worthiness.

Cleopatra's Needle on the Thames Embankment is a familiar object. It had a romantic journey from Egypt. A special boat was made to contain the huge monument, and then a tug was chartered to bring it home. It is a long voyage through the Mediterranean, there is the coast of Spain and Portugal to be cleared, and then, worst of all, the Bay of Biscay.

On the latter section of the voyage rough weather was experienced, and later the cables gave way in a violent storm. No one could have blamed the captain of the London tug had he abandoned his tow, but he searched for the curious looking boat, found her, affixed new cables, when the weather had moderated, and brought her home in triumph.



Cunard Line R.M.S. "Mauretania" at Cherbourg

CHAPTER IX

THE CUNARD AND ANCHOR LINES

"I TELL you they are lost—and ever likely to be—flying in the face of Providence!"

"Say rather *steaming* in the face of Providence. But for all that, I feel certain that both the *Sirius* and the *Great Western* will arrive."

The speakers moved nearer the edge of the head-land, on which they had been watching day after day for a wisp of smoke which would tell of the coming of either of the steamers mentioned above. One man was down in the dumps, the other had faith, and the two were a fair sample of that anxious crowd which gathered early each morning to watch for these wonderful ships which were running the first ocean race under steam. One or two vessels had already crossed what we now term the "herring pond" with the new motive agent of steam, but in all these early attempts, sails had been depended upon for most of the voyage, steam being used when the wind was light or when a calm beset the ship. But here were two proper steamers which were to use their engines all the way.

Already they were days overdue, according to the advices sent from England of their date of sailing, and there was no cable to tell the weary watchers that delays had occurred which must make the plucky little steamers late in arrival.

Then there was a cheer. A thin wisp of smoke had been seen far out to sea, and though there were some, like our first speaker, who said it was a bird, it turned out to be the smoke from the funnel of the *Sirius*; later in the afternoon the larger *Great Western* came majestically up the bay. And that is how the steam liner first came to America.

The success of these vessels turned the thoughts of the British Government to the question of sending mails across the Atlantic by steam instead of by the sailing brigs, which sometimes took a month or even six weeks to make the voyage. An advertisement asking for tenders was issued. One of the advertisements came into the hands of a lonely agent of the East India Company living in Nova Scotia. The agent packed up his traps and set sail for England. Here he went from town to town trying to get people interested in his plan for a steamship line which should carry the mails, and as many passengers as possible. The agent was Samuel Cunard. Little did he dream then that one day his uncommon name would be known the world over, and that the term Cunarder would denote the finest kind of liner on the seas.

When he had suffered several rebuffs he found two men who were willing to find enough money to build four little steamers which should give a fortnightly sailing to Boston. Cunard tendered and got the contract, and soon four neat paddle-wheelers were launched upon that wonderful river—the Clyde—which has sent so many excellent ships to carry the British flag all over the world. They had rather good names: *Britannia*, *Caledonia*, *Acadia* and *Columbia*—the latter named out of compliment to America. When we are told that all four could



R.M.S. "Aquitania."—Cunard Line.



R.M.S. "Mauretania"—Cunard Line.



“Britannia,” “Acadia,” “Caledonia,” and “Columbus”

Three of the most famous of the early Cunarders, compared with one of the Western Ocean sailing packets of that day.

be stowed quite comfortably upon the top deck (called the boat deck) of the *Aquitania*, we can guess the kind of midgets they really were. Then, however, they were considered quite big ships, though now we should count them small, something like a fortieth of the size of the big ship just mentioned.

These were the ships that gave us the first regular steam mail service, and they did splendidly. Often they had to limp home with their big paddle-boxes badly damaged by gales. Sometimes the wheels revolving within the boxes suffered, and lost any number of their floats. But they were very safe and steady boats, all things considered.

People liked the new Cunarders so much that very soon some bigger ships were wanted. One of the next batch, the *Europa*, had two curious adventures, one of them rather sad. In a fog she cut right through a fishing smack without being materially damaged herself. It is not often that a vessel is cut right in two, but this actually happened, and the poor fishing vessel was never seen again. On another occasion the *Europa* was steaming slowly through a dense fog off Newfoundland when everyone on board was startled by the cry from the look-out: "Breakers on the starboard bow!" Before the course could be altered another voice called out: "Breakers on the port bow!" And still another: "Breakers right ahead!" The order to reverse engines was given and acted upon in a moment, else the gallant little *Europa* would have piled herself up on those cruel rocks. In the dense fog she had entered a small land-locked bay. How easily this might have been a tragedy! There was rather a curious sequel to this escape. The captain felt

that something had been wrong with his compass. It was tested, found to be untrue, and the cause was a remarkable one. Something had caused a deflection of the magnetic needle. Upon a test being made it was found that a new iron pipe, which had been substituted for one of brass, was the cause of the deflection!

The first Cunarder sailed in 1840, and for about twenty years after this date all the new ships were built of wood, and all had paddle-wheels. In the 'sixties a great change over was made. The paddle-wheels gave place to the screw propeller, and iron was used for building all new ships. The last paddle-wheeler was the beautiful *Scotia*, which broke all Atlantic records when she first came out, reducing the passage to slightly under nine days. The *Britannia* and her sisters had required an average of fourteen; now the seven-day passage was in sight. The *Scotia*, though a very popular steamer—so popular, it is said, that the Cunard did not take her off the service when she was no longer profitable—burned a tremendous amount of coal, and about this time new and more economical kinds of engines were being tried. The *Scotia* was at last taken from the fleet and sold for cable laying; she laid quite a number of present-day lines. Her owners took away the huge paddle-wheels, which, when standing on land, were higher than many houses, and a screw propeller was then used to drive her.

Then there was the *Russia*, a great favourite with all voyagers sixty years ago. She had a very popular captain, and so regularly did this fine vessel make her voyages, without even the slightest mishap, that old travellers would stipulate that they must have a berth in her, and no other. She conveyed

26,000 passengers across the "herring pond" in perfect safety, steaming 630,000 miles to accomplish this fine feat.

The first *Scythia* felt a bump one day, and the look-out man reported that a large whale had deliberately charged the propeller; he saw it come and he saw it go, but the whale failed to report how he liked the swirling screw!

Another favourite steamer, the *Pavonia*, was reported missing, and day after day went by without any news of her. There was no wireless to call up and say that she had lost her propeller and was drifting towards the Equator, right out of the track of Atlantic shipping. That was the nature of her mishap; she was helpless.

The weather began to be rather wild, and the poor captain to have misgivings. If she rolled too much there was a chance of the heavy boilers breaking loose and pounding her hull to pieces. Before this could happen, however, a stranger hove in sight, saw the distress signals, and came to her aid. A tow rope was passed to the tramp steamer (a tramp is a vessel that sails to any port for any cargo obtainable, instead of plying on a definite route). The tramp did her best with the crippled liner; then the rope parted! The gale was renewed, and the tramp lost sight of the *Pavonia*, whilst hope on board the latter began to fail. But the gallant rescuer intended to secure the *Pavonia*, and, by good fortune, she did so the next day. Another rope was got aboard and the *Pavonia* towed safely to port.

The 'nineties were great years on the Atlantic Ferry, and then several companies were trying for the "Blue Ribbon of the Atlantic."

The Cunard had been out of the running for a year or two when they put in service the splendid sisters, *Lucania* and *Campania*. These magnificent boats won back the Blue Ribbon, but alas, within four years they lost it to Germany! But again, after ten weary years the Cunard won back the coveted ribbon again for Britain with the famous *Mauretania* and *Lusitania*. The latter was built upon the Clyde; the *Mary*, as she was always called for short, was launched upon the Tyne.

Not only did these fine 31,000 tonners wrest the speed record from the Germans, but they began setting up their own records, and as promptly knocking them to smithereens. Stirring days those, from 1907 onwards! Always there were rumours that the Germans were after the Blue Ribbon again. And when the Germans were not mentioned, there were stories told of American wonder-ships, and also of vessels building in Britain, which would annex the Atlantic record. The Cunard, like a certain rabbit we know of, "said nuthin'" but they knew that the Blue Ribbon was fairly safe. Everything had been done to secure a high rate of speed, twenty-five knots was stipulated, and it was easily exceeded in the *Lucy* and the *Mary*. Bigger ships were built for other British Lines, and the Germans exceeded our biggest, but none of them reached this wonderful speed. Every knot added to the speed of a liner means hundreds more tons of coal or oil per round trip, and it does not pay, so we are not likely to see many faster vessels than the *Mauretania*.

The *Mary* has been converted to oil fuel burning, and still romps home ahead of her rivals, though they press her hard at times. She is the smallest

of the three express steamers of the Cunard fleet, but if a vote were taken for the most popular liner afloat, I believe this flier would head the list quite easily. Voyagers get as attached to particular liners quite as much as people centre their affections on a horse, a train or a motor-car.

The *Aquitania* is the second of the trio of fast ships. She is much larger than the *Mary*; indeed, she is the biggest ship yet built in Great Britain. Many call the *Aquitania* the comfort ship. She is fast, besides comfortable, and a great favourite. Then there is the biggest of the three, the *Berengaria*, once known as the German liner *Imperator*, at one time the biggest and finest ship afloat. She was taken over to replace the luckless *Lusitania*, which was torpedoed during the Great War, but she does not quite appeal to us like the home made article.

Another very famous line is the Anchor, which has its headquarters upon the Clyde, and is now owned by the Cunard. Right back in the 'fifties of the last century the Anchor flag was carried to New York, to the Mediterranean and to Bombay. These services have always been popular, and they are in full working order to-day. You will perhaps have noticed that all the Cunarders mentioned had names ending with the letters "ia," so, too, have the Anchor Line steamers. This is rather convenient, since the two lines are now under one management. Having a class name, or a fleet classification by means of names, is a splendid idea really, as it enables one to remember to whom a vessel belongs. Once the Anchor Line departed from this system of naming their ships. This was in the *City of Rome*, but there was a good reason for it. This

beautiful three-funnelled liner, perhaps the handsomest vessel of her day, was built for the Inman Line, whose ships always had the words "City of" in their names. The *City of Rome* did not quite reach the stipulated speed, therefore she was returned to the builders, who without any trouble, were able to sell her to the Anchor Line. The picture of the ship was used in the new owners' notepaper and advertisements. The story is told that a party of European emigrants refused to sail upon an Anchor liner because she had but one funnel! They pointed to their tickets, which showed the three-funnelled *City of Rome*, and it was an awful business to persuade them to walk up the gangway of the single-funnelled ship. Like many other people they thought that the number of funnels showed the power of the ship. As a matter of fact, they have little to do with it. At the moment the tendency is to reduce the funnels. Thus the biggest ships of all, such as the *Berengaria*, have three, against the *Mauretania's* four, yet the latter vessel is only about three-quarters the size of the German-built steamer. The *Homeric*, of the White Star, is the same size, approximately, as the "*Mary*," but the White Star boat has but two funnels. The *City of Rome* was one of the first vessels to have three, but she was only a third of the size of many ships which are now being built with one funnel. So, you see, funnels are not the guide to a ship's size that one might imagine.

The Anchor Line has completed a fine new fleet, too, for their American service, and these bear names which have long figured in old Anchor fleet lists.

WHITE STAR LINE



The "Old Reliable," otherwise the White Star "Olympic,"
on trooping Service in the Great War

CHAPTER X

THE WHITE STAR

THE fastest sailing-ships which ever raced across the wide seas were the clippers—famous ships under famous captains. With every inch of canvas stretched, these splendid ships raced each other just as the fastest of our great liners do to-day. But there was this difference: the liner is built for a certain guaranteed speed, which must be maintained upon the trial runs; the clipper was an unknown quantity until she had been years in service. A slight rearrangement of sail area, the addition of a new sail, or even the spacing of the towering masts, made a vast difference in her speed.

The clippers reached their best in the 'sixties' of the last century, and it is a fact not generally known that the best of them were faster than the finest liners of their day. But—and there is always a but in the sailing world—the clipper was a child of strange caprice. Give her the wind she loved, and she would race home all the way from China with tea—or to Australia with emigrants—in times which left the steamship owners envious. Too often, however, the slower-going steamer would get home first, frequently passing the poor clipper becalmed within sight of home. As improvements were made in marine engines, increasing the speed,

and tending to economical working of the liners, the day of the clipper was seen to be over. Many of the famous lines which had pinned their faith to the sailing-ship now began to turn to steam. Amongst these was the White Star Line, which turned definitely from sail to steam in 1870.

In the steamship world one must commence right; many companies went off with what we may call a flourish of trumpets, full of promise, but with something missing. The missing link in these cases has often been a personal one; that is to say, there has been no one at the head of affairs like Cunard, or like Ismay and Imrie, the joint founders of the Oceanic Steam Navigation Co. The latter is but another title of the White Star Line. The new line began right because they felt that only the best possible ships would serve their purpose. The first steamers were ordered from a small Belfast firm, named Harland and Wolff, and the success of their products for the White Star has now made them one of the greatest of our shipbuilders.

When the White Star want a new ship they don't trouble to send round to several builders to ask how much it will cost; instead, they write to Harland and Wolff and say: "We want a liner with a speed of 20 knots, with accommodation for the following passengers (here come the number of 1st, 2nd and 3rd class passengers), and she will be required for the Canadian trade." That is all—and at once the builders get busy on the design. They make a model showing the kind of ship they propose, and, in most cases, the reply comes back: "Get on with it, and we should like to take delivery on such a date." The date will probably be two years ahead. That gives the shipbuilder plenty of time to com-

plete the vessel down to the smallest detail, and hand her over spick and span for service. The question of price does not come in because a careful return is kept of every penny spent upon the ship, and upon this amount a certain percentage of profit for the builders is allowed, the result is that the White Star get the best possible ships and the builders are safeguarded against loss. The latter point is very important, because, if steel went up very rapidly in price during the building of the ship, after the agreement was made to deliver for a certain sum, it would be very bad for the builder, and he might be inclined to make good his losses by various ways which would not be to the advantage of the owner.

That is how the first White Star liner, the *Oceanic* was built, and the long list of steamers which have come from those famous Belfast yards have followed upon that very fair method of building.

The first *Oceanic* was just as great an improvement upon the ships of 1870 as the *Mauretania* was upon the liners of thirty-seven years later.

The new ship had what we may call open decks, fitted with rails, so that as the heavy seas came aboard they could get away quickly; and then her saloon was placed amidships instead of at the stern, where the whirring of the propeller was such a nuisance. Then also she was a big, comfortable ship for her day, and quickly became a favourite.

Followed many other vessels, all with their names ending in "ic," but if you looked right through the list of all the ships built for the White Star you would not find either a *Pacific* or an *Arctic*. There is a reason, and we find it in the superstition of the seamen; they believe that to name ships after

a vessel which has been lost will mean disaster for the newcomer. Many years ago Uncle Sam felt that the Cunard, and other companies, were getting too much of the cross ocean traffic, and an American company was formed under the title of the Collins Line. Four beautiful paddle-steamers were built with names ending in "ic." Amongst them was a *Pacific* and an *Arctic*. All four ships were faster and more beautifully fitted out than the British vessels, so that, for a time, it seemed that our cousins across the Atlantic would take all our traffic. Just when Uncle Sam was patting himself upon his back because things were going so well, the *Arctic* was run into by a small ship. Though badly wounded no one believed that so fine a vessel would sink. But sink she did whilst trying to reach the shore, and over 300 people were lost. Not long afterwards her sister ship, the *Pacific*, sailed and was never heard of again.

What was her fate? We can only guess that she ran into a derelict or into an iceberg. There was no wireless then to send out a call for help. And that is why these names have never been found in the White Star list.

Two very famous ships came out in the 'seventies these were the *Britannic* and the *Germanic*. For more than thirty years they crossed the Atlantic as regularly as trains perform their journey on land. And so splendidly were they built that they were actually doing better at the close of their career than when first put in service. Even more famous were the sister ships *Majestic* and *Teutonic*. They were much bigger and faster than the earlier vessels and each held the "Blue Ribbon" of the Atlantic in their time. Both continued in active service until

1914, though built as far back as 1889. The *Majestic* went to the ship-breakers just as war broke out, and the *Teutonic* went on active service as a cruiser.

Both vessels have been designed for use in this fashion, and there is a story told that when the German Kaiser inspected the British Fleet, in which the *Teutonic* was serving temporarily at the review for Queen Victoria's Jubilee, he spent so much time upon her that he had to miss the inspection of the battleships.

The second *Oceanic* came out in 1899, and though not a greyhound she was the biggest and finest ship of her day. She was lost in the war whilst acting as a cruiser. Then, rather more than twenty years ago, came the "Big Four," the *Baltic*,* *Celtic*, *Cedric* and *Adriatic*, huge ships of over 20,000 tons, not very fast, but wonderfully comfortable. If any of my readers want a really enjoyable holiday, make a trip on one of the "Big Four." There are many voyagers who will not travel upon the fliers because the trip is over so quickly. The "Big Four" sail from Liverpool, whilst the express White Star boats go from Southampton.

Next come the *Olympic* and the *Titanic*—splendid sister ships almost double the size of the biggest of the "Big Four." The *Olympic* is a lovely ship and she has a fine war record. Not only did she take thousands of American "Tommies" to and from France, but she fought and conquered a German submarine.

The submarine broke water to send her deadly missile along for the destruction of the White Star's

* Since this was written the 'Celtic' is out of the fleet, having gone ashore off the Irish coast and is being broken up.

finest ship, but the crew were alert, splendidly trained, and quick to obey. Like lightning the huge ship turned and went straight for the very surprised submarine, and an English destroyer picked up the Germans who were fortunate enough to escape from the sinking U-boat. A plate upon one of the numerous decks now records the incident.

The poor *Titanic* struck an iceberg upon her maiden voyage in the year 1912, and after a gallant fight with the sea went to the bottom. Sad though the loss of so gallant a ship must always be, the fine heroism of British men, women and children taught us that the true stock still remained, and whatever toll the sea must take, our people had still the courage to meet disaster as in days gone by.

The second *Britannic* was finished in the early war years, and her life, too, was very short. A splendid ship, even bigger than the *Olympic*, she was lost in Grecian waters whilst serving as a hospital ship, striking a mine whilst upon her errand of mercy.

To replace the *Titanic* and the *Britannic* the White Star have two German-built ships, both finished since the war, and these bear the names *Majestic* and *Homeric*.

The *Majestic* claims to be the biggest ship in the world, but Uncle Sam says his *Leviathan* is rather larger. As the size of a ship is estimated by internal measurements, which may be varied after building, it is a fine point. The two monsters were recently lying side by side at Southampton, and the eye could not detect any difference, but actually the White Star boat is six feet longer. The *Majestic* is the newer ship, having been completed since the war, whilst the *Leviathan* was new in 1914, and lay in America when fighting began.

The *Homeric* is smaller—rather larger than the famous *Mauretania*, though she has only two funnels against four of the Cunarder.

Some years ago a cold shiver went down the backs of most Britons when it was announced that the White Star, the Red Star and one or two other companies, had been bought up by American capitalists. Letters began to appear in the Press saying we were going to the dogs, that our best ships would soon be flying the Stars and Stripes, and that, in case of war between ourselves and the States, our fine liners would be employed against us instead of for us. What really happened was, that an American company secured a great holding in these steamship lines, but it was only the same thing happening as in the case of South American railways, the capital of which is largely held in Britain.

As the Americans could never build ships so cheaply, nor run them so economically because of the higher cost of everything across the "Herring Pond," no vital change ever took place. Besides which a ship must be built in America if it is to fly the Stars and Stripes.

In 1927 the White Star Line became wholly British again.

Years ago there was a very famous line of steamers called after its founder—the Inman. This was the first English company to be bought up by the International Navigation Company of America, who subsequently acquired several of our premier lines. The question was then "Were the *City of Paris* and the *City of New York* (at the time of the sale the two finest liners afloat) to be debarred from using the flag of their new owners?" The reply

to the question was a special Act of Congress which allowed them to fly the Stars and Stripes, the Act insisting also that two very similar vessels should be built in the United States to make up the quartet of express steamers. The new ships were the *St. Louis* and the *St. Paul*, and they sailed under the auspices of the American Line, a branch of the International Mercantile Marine.

This quartet made their headquarters at Southampton, and proved to the rest of the Atlantic companies that the southern port was a better terminal than Liverpool. It is rather strange that this was not realised earlier, because, for some years before the International Line came to Southampton, German companies were sending their crack liners to pick up what English traffic they could after having obtained a practical monopoly of their own, and from France also.

The White Star then decided that they would have a service from Southampton, though it is doubtful if they at first thought of their premier ships coming to the Channel port.

But it was soon evident that the move was a good one, and it was determined to place the largest steamers in the fleet on the Southampton—Cherbourg—New York service.

The Cunard were not long in following, and now, though the American Line no longer has any express steamers on the service, there is the United States Line with its huge *Leviathan*, and the Red Star with its handsome *Belgenland*, one of the best looking ships ever turned out from Harland and Wolffs. In addition, the Germans have come back, and are building two ships of the same size as the *Olympic* for their New York service.

Quite recently the writer saw four famous ships in a single dock; they were the *Mauretania*, the fastest liner; the *Majestic*, the biggest British ship; the *Leviathan*, the biggest American liner; and the *Columbus*, the largest of the German ships then in service. A wonderful quartet of mixed nationality!

The White Star is building a very large liner, exceeding even the *Majestic*, to take the place of the *Homeric*.

CHAPTER XI

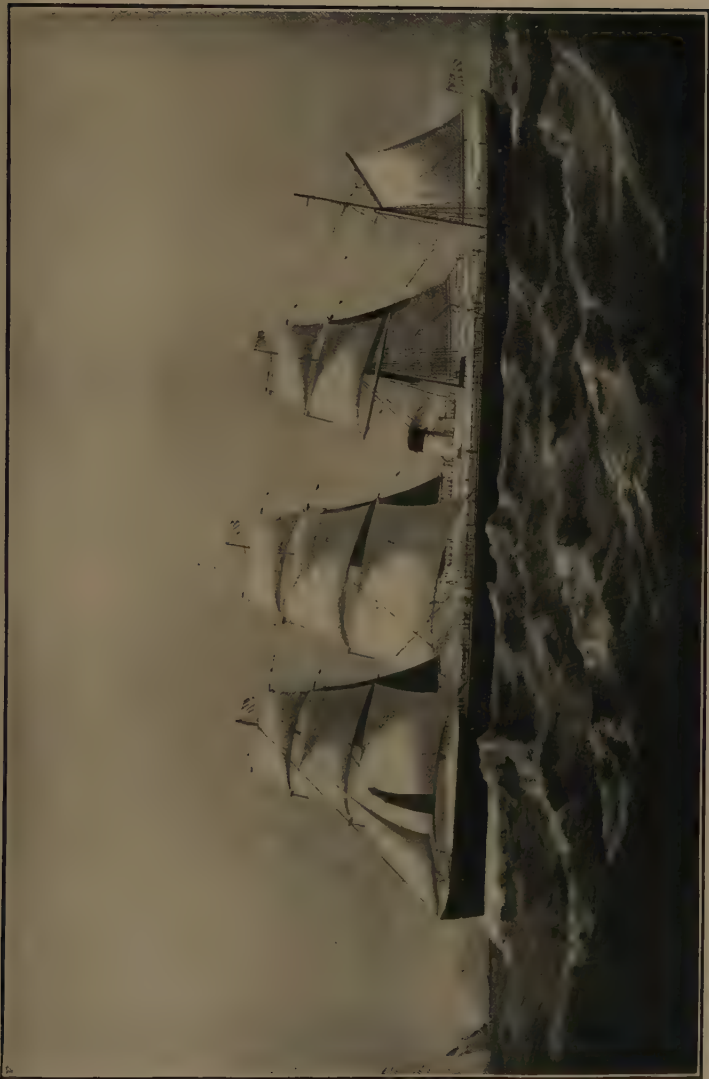
THE CANADIAN PACIFIC

SEVENTY years ago there were two distinct Canadas—the East and the West; between them lay a great tract of country, which divided them far more than a similar stretch of ocean would have done. The far-seeing men of either side saw that if Canada were to become really great the East and West must join hands. They did it by means of that famous railway which stretched right across the big continent.

The very promise of that railway made the union of the two Canadas certain as nothing else could have done, and so led to the formation of our greatest dominion.

“But what has the railway to do with steamships?” I can almost hear you asking. “Everything!” would be the reply.

When the railway was finished the pioneers thought to themselves: “Here we have a great iron road to carry people across Canada from East to West, but what about those travellers who do not want to settle in the West? What of those who dread the sea, and would give anything to save several miles on the voyage to Australia, New Zealand, Japan or China? Why should not the new railway become a portion of the shortest and quickest route



"Baltic"

One of the original White Star liners, built in 1871.



R.M.S. "Arundel Castle"
Union-Castle Line.



"Duchess of Bedford"
Canadian Pacific Line.

to these countries? Already there are splendid liners running from the Old Country to the Eastern ports of Canada, but what about the connexion beyond the Pacific terminus?" There was no regular service beyond, and as none of the existing steamship companies seemed to think it worth while the Canadian Pacific Railway decided that it would run its own fleet on the Pacific. As a start a portion of the fleet of the Cunard was purchased. These were naturally the older and smaller ships of that great company, but splendid ships, nevertheless. This was just the beginning, and it was better to experiment with well-seasoned vessels than to build new ones straightway. But so soon as it was seen that there was a future for a fleet, the C.P.R. (the short way of speaking of the Canadian Pacific Railway) gave an order for three liners of what is called the "Empress" class—that is, in each case "Empress of" formed part of the name of each ship. Thus we find the "*Empresses*" of *India*, *China* and *Japan* being put into service. Splendid ships they were when, in 1891, six years after the opening right across Canada of the great railway, they took up their sailings. They were painted white, and their raking funnels with their clipper bows made them appear like beautiful yachts. This first fleet ran from Vancouver, via Japan, to Hong-Kong, and so made still another link of Empire.

At first traffic did not flow to the Pacific steamers as quickly as the C.P.R. desired; one of them sailed with less than forty tons of cargo. And it is cargo that always pays the coal bill in the liner. The thought came to the directors that true success for their steamship venture could only be obtained when ocean transit under their flag began at an English

port. To build up an Atlantic fleet by slow degrees in the face of the opposition of the old-established companies did not commend itself to these go-ahead people. Instead they went to the Elder Dempster company and said, in effect: "We are going to run steamers on the Atlantic so that travellers will be able to go from Liverpool to Hong-Kong under our house flag. What about selling us a fleet?" Elder Dempster were quite willing to do business, doubtless thinking there was hardly room for another Canadian service. Fifteen ships changed their flag—that is, their house flag, not the good old Union Jack, of course—at one bound, and so the C.P.R. became established on the Atlantic more strongly than on the bigger ocean.

Strange to say, the Elder Dempster had already gone to an old-established firm possessing a fine fleet and had said practically the same to them. In this case it was the Beaver Line which was acquired, with ships whose names began with "Lake," thus, *Lake Michigan* and so on. Fine boats were these. When quite a boy I liked the Beaver more than other lines. You would never guess why. It came about in this way: I had a great interest in railways, and still a greater in the locomotives. From a bridge which spanned the old North Western main line I used to take the names and numbers of the engines. The bridge was splendid for the purpose in the summer, but in the winter the waiting-room of the down platform, with a roaring fire (coal was ever so cheap then), formed a better place of vantage. The walls were decorated with huge framed pictures of liners. And the Beaver advertisement showed not only a splendid ship clipping its way through the sea, but also a big beaver clipping his

way through a substantial log! The beaver was assigned a large corner of the picture, and the hard-working beast so fascinated me that I read up all about beavers, and really felt that a steamship line named after so fine an animal must be my first favourite.

Not content with all these fine ships the C.P.R. looked around and bought others. Two in particular were specially noteworthy, the *Empress of Britain* and the *Empress of Ireland*. Not many months after the gallant *Titanic* had met her sad fate the *Empress of Ireland* followed her. Then there was the *Milwaukee*, which went ashore off the Scottish coast. Her front part was terribly injured by the cruel rocks, which had pierced her hull, holding her a tight prisoner. By means of dynamite this portion was cut right away and the aft section, roughly two-thirds of her length, containing the valuable engines, floated clear. You might say, "Why did not this sink?" One would expect it to do so until it is realised that the hull is divided into at least nine distinct chambers by bulkheads, which are steel plates running upwards from the bottom of the ship to her main deck. When the *Titanic* collided with the iceberg she received a glancing blow which opened up 300 feet of huge length, allowing the sea to rush in and flood her deeply, but one or two of these divisions flooded at the stem or stern would not have affected her safety. Well, back to the *Milwaukee*, the bulkhead at the point where she had been cut into held quite well, so the hefty little tugs turned her round and towed her stern first to the Tyne. Here the ship doctors had a look at the poor crippled liner, "Yes, I think she will be all right now that we have her in hospital;

she will want a new forepart, and we think she will do very well." The damaged after-portion had been floated into a dock, the water pumped out, and the examination made.

There she lay a few weeks whilst, not far away, an entirely new portion was built, and it was made rather longer than the piece which had been lost, as it was thought a good opportunity to increase the size of the vessel. Now comes the ticklish part of the ship surgeon's work—the fitting together of the old and the new. The new portion is got afloat and taken round to the dock where the main part of the ship lies. This dock is flooded, the gates opened and the new section is floated in, and, by wonderful handling, is brought to the exact position required. The water is now pumped out of the dock, and if the work of bringing together the two portions has been done as it was intended, the task of joining up can go forward. If not, there is no other way but to flood the dock again and make the necessary adjustments, which must be accurate to less than an inch. Of all the wonderful work done in our shipyards there is nothing quite so interesting and intricate as the joining of the old and the new.

This was safely accomplished for the *Milwaukee*, and she came out of dock as good as ever she was, and considerably larger than she had ever hoped to grow. She was one of the vessels of the "M" class transferred to the C.P.R. fleet—hence her place in this chapter.

Perhaps the most famous line in the Canadian trade for sixty years prior to 1916 was the Allan, which commenced business in earnest in 1856, though they had been in the shipping world some

years before that date. As far back as 1859 a weekly service with the great Dominion was commenced. The ships of the Allan line had names terminating in "ian." One of the earliest was the *Hibernian*, which set the fashion for all future liners in having what is called a spar deck. This is really a covering for the main deck from stem to stern, and affords useful shelter for passengers in heavy weather. Then the Allan claimed to have built the first all-steel vessel at a time when it was felt that iron would never be beaten.

Still another feather in the Allan cap was the introduction of turbines on the *Victorian*. It was the success of this fine steamer, with the new type of driving machinery, that led, eventually, to the turbine-driven *Mauretania*.

The earliest form of steam engine on record consisted of a round boiler—something like a football—with a steam pipe let into the figure of a man, the steam coming from his mouth and playing on a kind of mill-wheel fitted with floats. That very early experiment was the real foundation of the steam turbine.

Hundreds of years went by before Mr. Parsons brought his invention to perfection. When he had perfected the turbine a splendid little vessel was built, named the *Turbinia*, and the invention was offered to the British Admiralty. Our Admiralty requires a great deal of convincing before a new idea is taken up, and they seem to have hesitated considerably over the turbine. The builders of the little vessel were determined that she would show her paces, and so, without any fuss, she went quietly down to Portsmouth, where a Naval Review was being held. Now there are certain things a private

vessel may not do, and certain sections of water that she may not use. The skipper of the *Turbinia* knew all about these regulations, but he had certain instructions. He started off down the long line of warships, ignoring all signals and cries to turn back which came from them. Soon a couple of destroyers were sent hot-foot after him. Never were destroyers led such a dance; these, easily the fastest craft afloat, were completely outpaced by the stranger.

There was no need for the *Turbinia* or her owners to do more. The captains of the warships said: "If you do not secure the secret of that marvellous craft for our navy another Power will, and where shall we be?"

So it came about that turbines were adopted, first for destroyers and then later for bigger vessels. And that is how the *Victorian*, of the Allan Line, became turbine-driven more than twenty years ago.

During the war—in 1916, in fact—the C.P.R. bought up the Allan Company with its fine fleet, and so became one of the biggest of our steamship lines. Wonderful progress this for a railway which began work just forty years ago, and has now built up two distinct and magnificent fleets. Its vessels set out from Liverpool, Glasgow, London, Southampton, Bristol, Antwerp, Havre, Hamburg and Genoa, and they end their voyages in Japan, China and Australia, besides that splendid link with the eastern ports of Canada.

The ships have a very distinctive uniform—black hulls with a white band round them, green below the waterline, and buff funnels. One can recognise a C.P.R. liner at once by just remembering this uniform.



"Lima" and "Quito"

Two of the improved steamers built for the Pacific Steam Navigation Co.'s Service along the West Coast of South America in 1880.

Since the war a new fleet has been built and the "M" class are amongst the roomiest and most comfortable ships afloat. They are not big when compared with the giants of the Cunard and White Star fleets, but they are built to what is, most probably, the average tonnage of our ocean liners, viz., 16,000 gross. Tonnage does not mean weight in this case; it is a measurement taken inside the vessels to indicate the space available for passengers and machinery.

The new Duchess class are also being placed in service. These are very fine vessels of 20,000 tons.

CHAPTER XII

THE P. & O. AND THE BRITISH INDIA

“FROM small acorns do great oak trees grow,” is a simile that may well apply to our great steamship companies, and especially does it apply to our greatest group. We call it a group rather than a company, because there are several companies in close alliance, so close, indeed, that it would be difficult to divide them for the purpose of our story were it not that tradition, and other things, keep the old names going, and, in many cases, separate management is still maintained.

It was during the war that our two greatest companies, if tonnage and number of ships count, came to an understanding. The Peninsula and Oriental and the British India have each a wonderful history, a story of constant fights against rivals, and against conditions which too often seemed to threaten them with complete disaster.

Like so many of our great companies, the P. & O.—to use the abbreviated title, which everyone knows and uses—began with sail, tried it fairly against steam, and then had to come over to the new motive power. None of our old established lines liked the change; many held back until rivals had taken their traffic, then they made haste to repair their hesitation, not always with satisfactory results.

Really the P. & O. sprang from a service of sailing vessels which voyaged to what is called the Iberian Peninsula, but which we remember more easily as Spain and Portugal. Before the Cunarders had begun their constant voyaging across the Atlantic, the P. & O. was firmly established, yet, so great was the shortage of steamers at that time—the early 'thirties of the last century—that the company could only charter just one or two paddle-steamers. The first was the little *William Fawcett*, about the size of a present-day tug, or again of similar size to the steamers which ply between the Isle of Wight and the mainland.

Fancy starting off across the dreaded Bay of Biscay in such a cockle-shell of a craft! But what to-day is a very small steamer was then considered a giantess. After all, Columbus crossed the Atlantic in even smaller craft, but then again, as the old salt said nearly a century ago: "Bless your life, Columbus was in the better case, for he did know all about sailing-ships, but who knows what may happen to a vessel which carries a huge fire aboard!" Of course, there is something in that if one reflects; it is the unknown which is always terrifying, and strange mishaps had befallen these early steamers.

The second ship was bigger. It had quite a nice name—the *Royal Tar*. But the mighty liner of to-day boasts a horsepower of anything from 30,000 to 70,000, the jolly little *Royal Tar* (named probably after Britain's Sailor King, who had then so recently ascended the throne) was passing rich on 200 horsepower!

By 1836 the P. & O. was fully upon its feet, and began to build its own steamers, the first being the *Iberia*. Another and much larger ship had the name

Great Liverpool, suggesting, as indeed proved to be the case, that there was a *Little Liverpool* about. But though the Peninsula Company had a ship with a high-sounding name it was quite a small firm, quite content, for the moment, with services to Lisbon and Gibraltar, yet always casting an eye farther afield, though perhaps here it ought to be sea.

The mails for Spain and Portugal had long been conveyed in Government sailing brigs, and these services left a good deal to be desired. So the little company took its courage in both hands and said: "What about sending mails in slow, uncertain ships when we have the *Royal Tar* and the *Great Liverpool* doing their level best to give their passengers as short a sea trip as possible?" Not those words exactly, but something which came to that request. For a time the Admiralty, who were then responsible for our ocean mails, would not listen.

But seeing they would not hear of steam for war-ships, it was hardly likely they would jump at the chance of sending the mails by steamers. "These things take a great deal of thinking about, and we must be sure that your steamers are as safe as our sailing brigs. You might get the vessels on fire and burn up His Majesty's mails. What then?" That is the sort of reply the Peninsula Company got at first. But there is always a way through the strongest armour, and the young shipping company found it. The merchants were the way in this case. They were able to prove that their trade was suffering through the slow mail boats, and soon the Peninsula Company became the Peninsula and Oriental Steam Navigation Company, with a mail subsidy that cheered the hearts of the directors. That addition

to the title meant, as you may have guessed, that the steamers were to go to the East. This was accomplished in two ways; ships began to go round the Cape of Good Hope to India, and smaller ones to Alexandria, in Egypt. The long dream of many who dreaded the rough voyage round the Cape was at last accomplished, because the Egyptian overland route was soon in being. Passengers were landed at Alexandria, whence, by the Nile and canal, they reached a point just a hundred miles from Suez. This part of the journey had to be done upon the back of camels, and though you and I would have just loved exchanging the ship of the sea for the ship of the desert, there were thousands who dreaded it. The desert is all right as a novelty, but once its parched sands become part of your regular routine, the charm goes quickly, and never returns.

As time went on, the desert was spanned by the railway, and the worst part of the journey to the waiting steamer in the Red Sea was done away with. Even so, it was a dreadfully slow business, and involved great delay in transshipping luggage and cargo. The next step was a big one—the cutting of the Suez Canal, which at length made it possible to get in the steamer at London and leave it wherever it happened to have its terminal point. Strange to say, the opening of the famous canal was a terrible blow for the P. & O. They had built up a splendid overland service at great cost, with just the right-sized ships to connect at either end of it. Quite a different kind of vessel would be required for the long through service.

So far the P. & O. had been content with services to India, now the whole question had to be faced

afresh, and so we find them extending to China, later to Japan, and also to Australia. What a network this wonderful steamship company was weaving across the southern sea, a network which even now is not complete, if rumour is to be believed.

Each extension of the services was followed by substantial mail contracts, and these are always the bedrock upon which a successful company may build. Hundreds of thousands of pounds are paid annually by our Government for the safe carriage of mails.

By this payment much of the success of the British companies has been achieved, and it has always been an incentive to put larger and faster ships on the sea ways.

"How long does a liner live?" must be a question that often occurs to the lover of ships, of which, perhaps, the liner is the queen. Well, the life varies on different services, but if we said that about twenty years represents a fair average we should not be far wrong.

It is not that the good ship is worn out by that time—by no means; but the constant improvement which is always taking place in construction, and especially in engines and fittings, make a twenty-year old ship out of date. In the years gone by it was often considered to be a good plan to take a ship into dry dock and cut it in two. Then a new piece was let in, much in the same way as a dressmaker will let a piece in a skirt, and then the ship went to sea again, with perhaps a new forty feet added.

So carefully was this done that you and I could not possibly have been certain where the joint took place. This is rarely done now because machinery

improvements make liners go out of date much sooner than they did, and, also, hulls have grown tremendously. Thus, one of our great steamship companies has replaced the whole of its pre-war fleet, except for one or two ships, which, just before 1914, were quite new, and have now been re-conditioned and fitted for oil fuel also.

The P. & O. once had what was probably the longest-lived liner of any company. This was the old *Himalaya*, which, built in 1853, did nearly half a century of work as liner and trooper. Fancy the almost countless trips that fine old ship must have made between this country and India!

As a boy I remember her well, in her nice white coat, with our Tommies aboard; yet she was running years before the Suez Canal was opened!

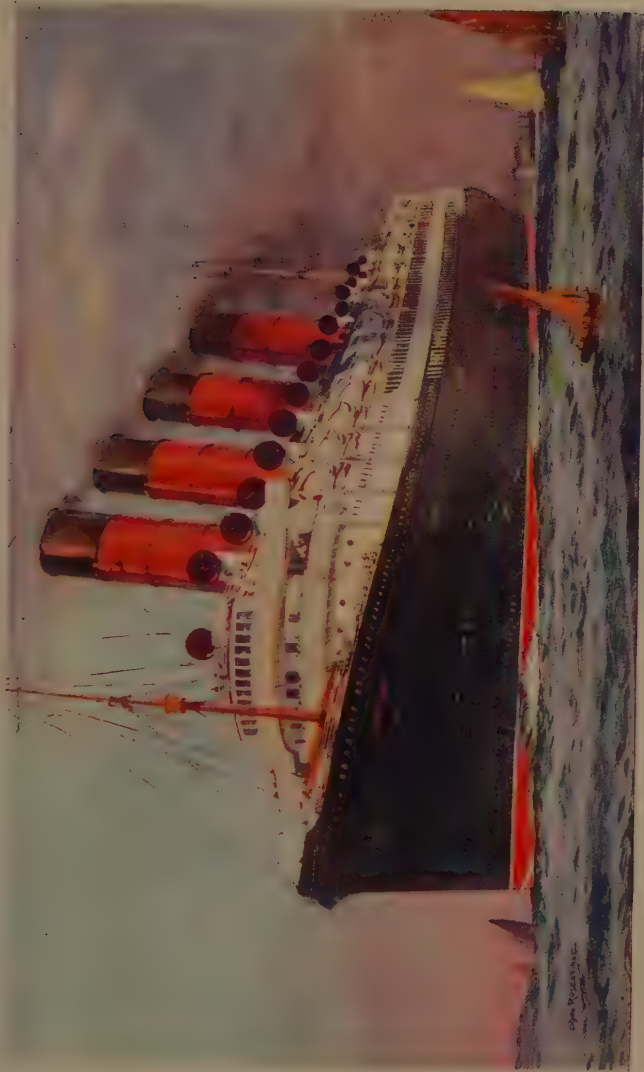
The ships of the P. & O. fleet have grown very steadily from the period which saw the coming of *Himalaya*, and now they have caught up the big ships of the Atlantic. At one period we might have said quite safely that the ships to the Orient were half the size of the greyhounds to America. Now, for the latter service, few of the new ships exceed 20,000 tons, and there are already some of the new P. & O. vessels which equal that tonnage.

These huge ships have a wonderful cargo capacity. One of the medium-sized ships can carry 13,500 tons. Think of that in coal and you will have to think of thirteen and a half long trains, each with 100 trucks, which each contain 10 tons. It does not seem possible does it? Then there are ships upon the Australian service which, though they have plenty of cargo space, find it filled on the homeward trip because wool is light, and takes up a great deal

of space for a comparatively small weight. How do you think the P. & O. get over that difficulty? Very simply, really. There are always a great number of emigrants to go out, and not many third-class passengers to come home; therefore, the plan is adopted of making the passenger quarters collapsible. Thus, a deck, which houses emigrants upon the outward trip, will provide accommodation for wool on the homeward journey.

The British India—the second great partner of the P. & O. group—has the largest number of ships of any existing company, owning more than 170 vessels at the moment of writing. We say moment of writing because this company has a happy knack of going to shipbuilders and saying: “What could you do us a dozen liners for, with such and such tonnage?” And before you can say Jack Robinson, as it were, the British India has several strange names in its fleet. Where it gets all the names from puzzles most people.

Yet, like the P. & O., the British India began in the smallest manner imaginable, just like a little shop which begins round the corner, and which, one day, has branches in every town of note. Beginning with two or three little ships, just before the Indian Mutiny, the British India at first confined its attentions to the trade between Calcutta and Burma. The first ship was lost almost at the start, through being run down in the river just outside Calcutta; the vessel that was ordered to replace her was wrecked on her way out, and, too often, later vessels were attacked by the native pirates and captured, not without a stern fight, of course. Others were wrecked upon unchartered rocks, and altogether the promoters had every reason for losing



R.M.S. "Mauretania" at sea
Cunard Line

heart. But they just didn't—they were Britishers, so there is no need to say more.

Up to the opening of the Suez Canal the British India were content to work their ships in the Indian Ocean. But it did seem ridiculous to bring cargo to Suez, and pass it to rivals; so very soon we find their ships threading that narrow water, and coming right to London.

The ships of this company have never been so large as the P. & O. and other companies serving the East, but there is a very good reason for this; it is that, in the majority of cases, they were serving ports where large ships could not venture, or where, if they could venture, it would not be worth while. That is why such monsters as the *Majestic* and *Berengaria* on the Atlantic can only be employed to New York, and why they barely pay their way.

Like the P. & O., the British India got to Australia; indeed, the Queensland Government asked them to start a service. The service was from London to Brisbane; at first it did not pay, and it seemed likely that it would have to be withdrawn. The company determined to succeed here as elsewhere, and losses simply made them keener to win an assured position; they did, and then began to look farther afield—or, again we ought to say—asea. East Africa was then given services.

All our steamship companies have done their very best in times of war to serve their country's flag, and it seems unfair to select anyone for special mention. But the record of the British India is so unique that it shall be given just a brief note. In no fewer than thirty wars in which we have been engaged some vessels of their fleet have carried our Tommies, their equipment and their stores. The

record begins with the Indian Mutiny, and ends—let us hope really ends—with the Great War, when 120 ships went on service and a sixth of them never came back. More would have been lost had it not been that they were mainly employed out of the reach of the German U-boats. Even in the South African War thirty-seven were on transport duty.

Many of the new vessels are motor-driven, and there are numerous experts who think that the day of the dear old steam-driven liner is past. But we hope not!



The Union-Castle Line Royal Mail Motorship "Carnarvon Castle", 20,063 tons.



Motorship "Alcantara." Royal Mail Steam Packet Co.

CHAPTER XIII

THE ROYAL MAIL STEAM PACKET AND ELDER- DEMPSTER

WHEN Queen Victoria came to the throne there were a few steamships, but no ocean steamship lines. The infant steamer was looked upon as a very remarkable child, who was not to be trusted far from home. All the mail services, across the ocean at any rate, were in the hands of sailing ships, and many of the latter were very small. The Admiralty looked after the packet services for our Post Office, providing what were called "gun brigs" for most of the work. On the whole the gun brigs were fairly satisfactory, especially as the steamers of this period were rather uncertain sort of people. But when the little *Sirius* raced the bigger *Great Western* across the Atlantic with such success, and in so little time as compared with the vessels depending upon sails, the tide set in towards the steamboat.

The merchants of the West Indies were amongst the first to realise how greatly a regular steamship service would help in their trade with the mother country, so we find them, immediately after the ocean race just alluded to, putting their heads together to induce the Admiralty to go from gun brig to steamship. When the merchants found that they could not get their way a new plan was made;

they offered to provide the fleet themselves, and formed a company to do it. A Royal Charter set them fairly upon their feet, and so, in 1839, we got the Royal Mail Steam Packet Co., usually known as the R.M.S.P. for short. The Charter allowed the new company quite a range of activities far beyond the West Indies; and that is why to-day their handsome ships may be found in many ports in the North and South Americas.

Though the Admiralty had relented so far as to allow the mails to travel in steamships, privately owned and worked, they were by no means happy about it. First, they insisted that one of the Admiralty surveyors should exercise an oversight when the fourteen vessels of the original fleet were being built. When they were in service the Admiralty appointed an officer to travel with the mails, giving him powers which would never be allowed to-day.

These first ships of the R.M.S.P. were named after famous rivers, and ever since we have found such names as *Avon*, *Trent* and so on in the fleet. But of late years there has been a desire to have class names—thus there is an “A” and an “O” class.

In the year 1848 gold in large quantities was found in California, and there set in a rush to the state we now associate with film production. The ships of the R.M.S.P. were crowded because, at that time, there was no railway across the North American continent. Such being the case, the best way to the goldfields was to embark in a R.M.S.P. steamer, and get out at Panama; then, by means of canoes and mules, the narrow isthmus was crossed, and another steamer taken at the Pacific coast, and so

up to California. They were exciting days, indeed, and never have the liners of this famous company been so crowded. Some of those who made the trip came back with untold wealth, others with a lasting disappointment which they could not conceal.

The gold rush led to a railway being made across the isthmus, but this would not have been possible had not the R.M.S.P. lent the necessary capital to the railway builders.

Next came the Crimean War, when the young fleet did splendid service, the French also taking over one of the ships. At a later period, when Garibaldi was making his bid for the freedom of Italy, an Irish brigade was formed under French support, and this brigade sailed away in the *Dee*.

Then, in 1861, gold was discovered in British Columbia, and once again there was a rush for these steamers with river names, following the same route as in the previous rush, but now using the railway across the Isthmus of Panama.

It was the R.M.S.P. *Trent*, carrying two commissioners from the Southern States, that was stopped by a North American warship and made to surrender them. The North and South were then engaged in a deadly struggle over the slave question. Though Britons wished to see the slaves free, somehow our sympathies went more to the Southern States. Really, I suppose, it was because they were being beaten, and John Bull has always a sneaking sympathy for the fellow with his back to the wall, never mind what sort of a fellow he may be. For a time it looked as if we might be drawn into this bitter struggle, because there were people, as in all disputes, who lost their heads, and cried

for stern action against the Northern States, even to make war on them.

Very fortunately the commissioners were set free, and so the incident closed.

As on the other steamship lines we have noted, the ships of the R.M.S.P. have grown up from the day when its tiny liners could be built at Cowes—now the shipbuilding centre for the smallest vessels only.

The “ O ” class ships have a tonnage of roughly 15,000; the “ A ” class are rather smaller, but, at the moment, there are two 20,000 tonners in service. These are motor-driven and rank amongst the biggest vessels driven by Diesel engines.

The R.M.S.P. are great people for holiday cruises, and at least one of their ships makes several trips to the Norwegian fiords during the season.

Like the Union-Castle line, which is now under the control of the R.M.S.P., by the way, the latter have a distinctive ship uniform. The hulls are painted black, with flesh colour at the water-line, a long white line runs round the hull, the deck fittings are white, too, and the big funnels are buff.

The Elder-Dempster Company is not perhaps in the public eye so much as some of the lines we have been chatting about, but it is nevertheless one of the most important shipping companies we have. Like so many of our great steamship lines, the Elder-Dempster came along with the beginning of the steam era in our shipping history. Actually a small sailing ship opened up their first and very important service as far back as 1832. The *Elburka* was sent out to open up trade with West Africa, and she voyaged up the Niger.



S.S. "Almanzora"
Royal Mail Steam Packet Co.



R.M.S. "Orama"
Orient Line.



“ City of Rome ”
The first three-funnelled liner.



Model of S.S. “ Philadelphia ”
American Line.

Her trip must have been fairly successful, because, for twenty years after, a fleet of similar ships kept up regular sailings with the dreaded West Coast, then far more deadly than now. When we say regular sailings, we ought to make it clear that whilst the despatch of the ships was pretty regular, their arrival was not. Ten days is now occupied by the well-known Elder-Dempster ships to the West Coast; then it was often six weeks. And I want you to imagine what the voyage meant. As often as not the wind would fail entirely, usually towards the end of the voyage. The result was that in intense heat, and with no refrigerating machinery to produce ice for consumption, or even for cold storage, the ships lay sweltering off the African coast. Absence of cold storage, of course, meant no fresh meat or vegetables, and the gentle art of tinning had not made the progress we know to-day; therefore we can guess the kind of monotonous food upon which the weary folk had to exist. For twenty years, then, these small sailing vessels, dependent entirely upon the caprice of the wind, served West Africa—then came steam. The first three steamers bore the inspiring names *Faith*, *Hope* and *Charity*—all of which virtues were badly needed by the travellers proceeding to that fever-stricken West Coast. Like so many of the liners of the 'fifties, these small ships were taken over for transport duty in the Crimean campaign. After the war two enterprising men, named Elder and Dempster, thought things needed livening up on this service; they secured control, and issued more capital to build a bigger and better fleet.

On one of those early steamers a tiny youth went out as cabin boy, and he had an awful job to get the

captain to take him. He was the best cabin boy the captain had ever come across, and though he would have liked to have kept him for future voyages, he did the right thing, saying to his employers on his return: "Here is a lad who has served me well. I really think he would serve you well, too. Give him his chance ashore, and see what he makes of it." Few boys could have seized their opportunity better than young Alfred Jones. He worked his hardest, and was ready for the next step in promotion when it was offered. Step by step he rose, until he reached the pinnacle of his ambition. The day came when the little cabin boy held supreme command of the great company, possessing dozens of ships, with a tonnage that totalled 350,000 tons—in round numbers that is. The cabin boy was knighted, and when, after years of service, he retired from his beloved work, he left the company on a firm foundation.

It is good to find that such promotions are possible in these later days; we are apt to think that Napoleon's adage that every soldier carried in his knapsack the marshal's baton rather overdrawn; such an instance as that quoted (and many more could be added), proves that the way is still open for the boy who means to get on. Though the number of batons may be strictly limited, the fact that they are there should act as a valuable spur.

When the African Steamship Company was fairly launched Elder and Dempster turned to the West Indies, and saw the great possibilities of the banana. To this firm, more than anyone, we owe the luscious fruit as a staple food in this country.

Special ships are necessary for the banana trade; Elder-Dempster provided these ships, and, incidentally, helped the West Indies over a bad patch in

their career, when sugar growing had reached perhaps its worst stage.

Later this enterprising firm looked to Canada, and saw that it was a goodly country, with need of additional shipping. It would have been easy to have built and started an entirely new line, but it is always better, and makes for less friction with one's neighbours, if you can go to an old-established firm and say: "How much will you take for your fleet as a going concern? We want to enter the Canadian trade; in fact, we are resolved, but thought it would be rather nice to offer to buy you out before starting a rival fleet." In this case it was the Beaver Line who were approached.

Now the Beaver were relatively a small company, and the Elder-Dempster already one of our largest, so they named their price, got it, and so, for a time, continued their sailings under their old name and flag.

Strange to say, when the Canadian Pacific Co. wanted to enter the Atlantic shipping trade, they went to the Elder-Dempster people, and said to them much the same as had been said to the Beaver Line. And so the ships passed on to a third owner, and the Elder-Dempster bothered no more about the English-Canadian traffic, though they have services from Canada to South Africa, and from New York to West Africa, besides all sorts of cargo services.

The present fleet numbers about eighty vessels, and here we find the up-to-date motor-ship much in evidence. In order to test the best method of driving ships, the Elder-Dempster have built, quite recently, a series of ships on exactly the same plan, save that the propelling machinery is divided between

ordinary reciprocating, turbine, and motor machinery; and, again, some of the steam-driven ships are coal and others oil-fired. In this way they hope to find the best type of machinery and ship for all-round service. There is a whisper that, so far as the trials have gone, the motor-ship has the running.

CHAPTER XIV

THE UNION-CASTLE AND ORIENT LINES

FIVE small vessels, built as steam colliers, was the modest beginning of the big Union-Castle Line. This first company, by name "The Union Steam Collier Co.," had no thought of huge liners and mail contracts. If their 500-ton vessels could load up well with coal in England, and take it at a reasonable profit to any port abroad, the summit of their ambition would have been reached. These tiny tots of ships had rather good names—the *Union*, *Briton*, *Dane* and *Norman*—and right down to a recent date there have always been one or two of the big Union-Castle fleet bearing some of those names.

Fate plays strange tricks with steamship companies as with men. It is doubtful whether the first steamers ever took a ton of coal abroad, since no sooner were they ready for sea than the Crimean War broke out, with the consequent demand for transports.

The P. & O. had to send several of theirs, and the Union colliers were sent to take the place of their larger sisters on the Mediterranean services. Not very long did they ply to and fro there; so great was the demand for transport that the Government took them over for this purpose, and off they

went with soldiers instead of coal in their holds. When at last the war was over and our gallant troops were safely home, the little fleet was returned to its owners, with many thanks for the way it had served. It was now just as if the ships themselves spoke to their owners, something like this; "Look here, gentlemen, we are a cut above coal. We have done well—we know that—and we should like to go on carrying humans—they are more interesting, and lighter."

Something like that the tiny ships would have said if they could have spoken. Anyway, the owners took the word "Collier" out of their title, and sent the five steamers to trade between Southampton and Brazil. It was no fault of the ships that the service was a failure. There was not yet the demand for extra sailings to a continent which had only just begun to develop after having achieved its freedom.

Then it was that the directors saw a golden bait dangling before their eyes. The Government had a £30,000 per annum mail contract to South Africa to give to a firm who could provide the necessary ships.

The Union Company tendered, got that contract, and soon we find the *Briton* and her sisters steaming off to the Cape with the Royal Mail pennant at their mastheads. Plucky little mailboats these, about a third the size of the cross-Channel steamers to France of to-day.

But what did they care? To escape coal carrying seemed to make them put forth every effort to succeed as mailboats, and they did.

In the very first year twenty-three round voyages were made, upon only two of them were the ships

behind time, and then by just a few hours, easily accounted for probably by a gale or by fog. Even the big Atlantic fliers of to-day could rarely show a better record, taking the year right through.

Gallant craft as these first steamers were, they had to be replaced; indeed, the mail contract stipulated something of this sort, but they kept the flag flying until ships double their size were in service. The mail contract was renewed, and others were added. This meant the inevitable growth of the fleet, both in the actual size of the ships and in their numbers.

So it went on, with a certain amount of rivalry growing between the Union and the Castle fleets. The Boer War made both companies see that there was really only room for one fleet to the Cape, especially as after the war there was bound to be a period of slump. And so it happened that whilst the war was in progress the two fleets were merged under the title Union-Castle. Some very beautiful ships were flying the Union flag at the amalgamation. One by one they have dropped out, until a single big, yacht-like vessel, painted in the splendid uniform adopted for the Union-Castle now remains. This is a sort of silver grey for the hull, white deck fittings and rails, and then scarlet funnels, with a deep black band round the top. It is quite easy to pick out a Union-Castle liner from the rest of the shipping of a port where they may be calling.

The Castle Company began with sailing ships to India. A young man, with great ambition—Donald Currie by name—was serving under the Cunard when he felt he would like to become an owner instead of an agent. He did not like to compete against his old firm, so he chose a service to India,

with sailings from Liverpool to Calcutta. The ships had "Castle" as part of their name, and when he saw that steamers would have to be employed Currie made them "Castles" too. Thus, the first steamers were named after the castles at Walmer, Dover, Windsor and Edinburgh.

These names have been held by later ships—sort of family names they have become. Whilst these ships were building, Donald Currie took a bold resolve. He moved his headquarters to Southampton, then nothing of the port we now know, and also decided that his new fleet should run to the Cape of Good Hope instead of Calcutta. So keen was he to get to work that he chartered a couple of ships to start the service pending the coming of his new boats.

It is not always realized how much our shipping companies help the countries which they serve. Often they are accused of charging high freightage rates, but if we were to examine these rates we should find that very little was added to the cost of an article by its voyage.

The Union-Castle people go farther than quoting cheap rates. They actually carry our pedigree cattle to the South African farmers free of charge. Already more than a quarter of a million head of cattle have gone out on terms that would appeal to all, and doubtless these lucky beasts had far better accommodation and greater care taken of them than the pioneer emigrants who went by sail in the olden days to the same country. Then South African farmers have been brought to this country as guests of the Union-Castle; no wonder the scarlet funnel liners are popular "down south."

As on other routes, the liners on the Cape services have been growing very rapidly. Before the war



S.S. " Naldera "

P. & O. Line.

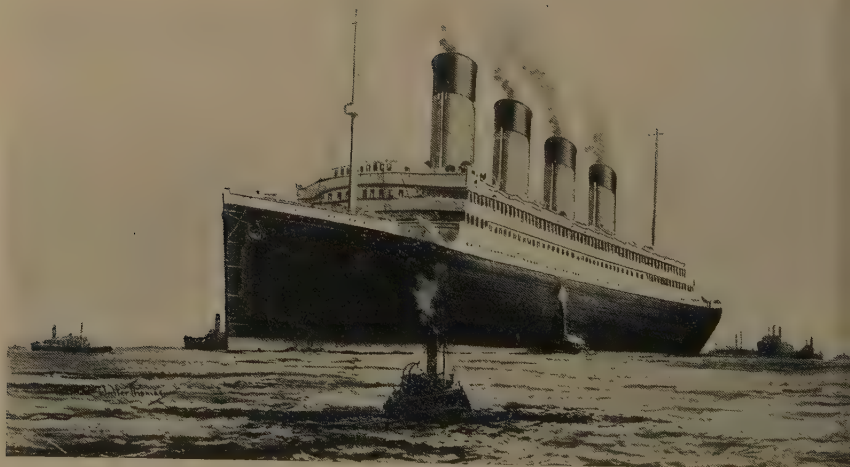


S.S. " Belgenland "

Red Star Line.



"Majestic"
White Star Line.



"Olympic"
White Star Line.

10,000 tons was considered quite big enough for the Cape; indeed, for every service save the North-Atlantic. Now with the handsome four-funnelled Castles of *Windsor* and *Arundel*, with their almost 20,000 tons, the Cape liners have reached the accepted general standard for the big ship. Others are even larger; these are motor-driven. Fancy ships of over 20,000 tons with motors! There seems no limit to the advance of the motor, and we are left wondering what sort of ships will be in the Union-Castle fleet in ten years' time.

The Union-Castle ships circle Africa, and by studying its special needs, they have no serious rivals to what used to be called the "Dark Continent."

If the Union-Castle belongs to Africa, then the Orient Line is essentially Australian. The Orient began with a splendid fleet of clippers, which were the greyhounds of the sailing-ships. These fine vessels did remarkably well, and were actually faster than the steamers of sixty years ago; but, however well they sailed one day, the next might be a blank, and so might the next, and so on. It was this uncertainty that led the Orient to steam.

The *Lusitania* was the first steamer to carry the Orient flag to Australia. Like so many other companies going over to steam, the Orient bought their first vessels second-hand. This was always good policy, because a commencement was possible with vessels which had already been well tried on other routes, and, by watching how they served on their fresh duties, plans could be made for the new fleet. Then very often money was short, and a reputation had to be built up.

In several cases new companies went off with a wonderful spurt, with brand new and expensive

ships, failed, and then lost heavily on the sale of the vessels, which had often been built regardless of expense.

Within a couple of years the Orient Company were well established; travellers liked their comfortable and safe vessels. Then they were able to go ahead with new ships, much larger than the pioneer liners; indeed, for a short time, one named the *Orient* was the largest ship afloat—always excepting that giantess, the *Great Eastern* which, launched in the late 'fifties, remained an easy first in the matter of size until 1899.

Although the Orient Company has always kept steadily in the forefront as regards the size, speed and comfort of its ships, it has never grown into a monster corporation like the P. & O. and the British India. Its fleet has always been small, its services always regular, and it has never bothered about fresh seas to conquer.

This policy has enabled the directors to concentrate on the excellent features mentioned above, and to-day an Orient liner just means the very best of its kind.

The ships of this famous line have nearly always carried names beginning with the letter "O." Some of the more famous ships are the *Ormuz*, which came along to smash all records between this country and Australia in Queen Victoria's first jubilee year (1887). The forty days' run set up by the earlier vessels was reduced to twenty-seven—a splendid performance, especially when the length of the trip is considered. When King George wanted to make one of his first long trips to the Dominions, long before he came to the throne, it was the splendid yacht-like *Ophir* that was chosen.

Painted white from tip to toe, she looked a lovely ship as she left the Solent. She was at that time—the 'nineties of the last century—the biggest vessel sailing to Australia, her tonnage being 6,500. Now we find the smallest of the Orient liners very much larger than the *Ophir*, whilst recent additions to the fleet have all reached the 20,000 tons, which marks the really big liner.

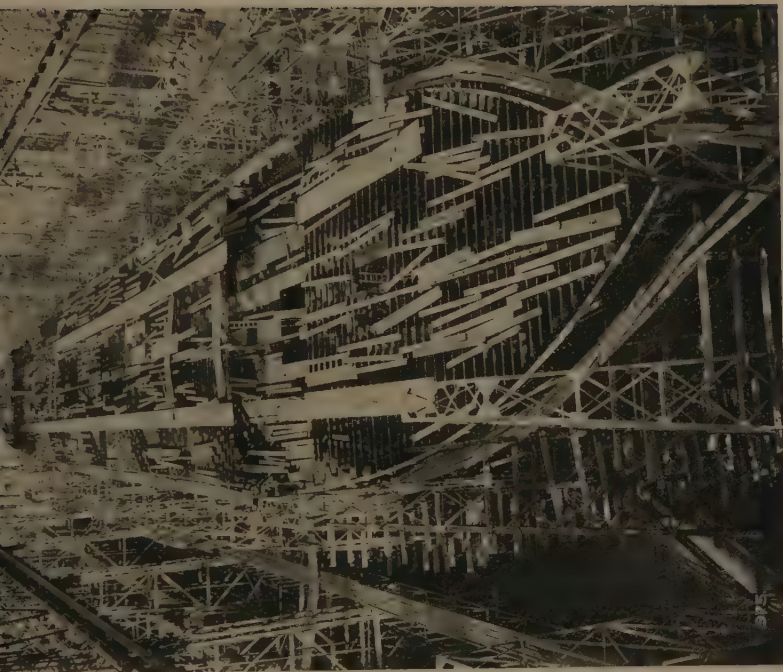
In the early days of the Orient liners the voyage was made via the Cape of Good Hope, still a favourite route with some liners, and whilst it misses the tedious Suez Canal trip, and the hot oven of the Red Sea, it also misses the great calling places on the Mediterranean, which no British company with Oriental sailings can be altogether easy in leaving out.

Thus, the Orient steamer, on leaving the Thames, makes for Gibraltar, then a French port, Toulon, is touched, an Italian, Naples, thence to Port Said at the beginning of the Suez Canal. Suez is the next call, and then comes a clear run to Colombo, Ceylon, where any passengers for India disembark. Now the good ship is right away for Australia, and here quite a number of big ports get a call. First comes Fremantle, for Western Australia; follows Adelaide, Melbourne and Sydney, until the port of Brisbane means that the end of a very long and interesting trip has been reached. The gallant vessel gets no real rest at Brisbane despite its long voyage. Within two days she is plugging away back to England, calling at the same ports again in the reverse order to that given above.

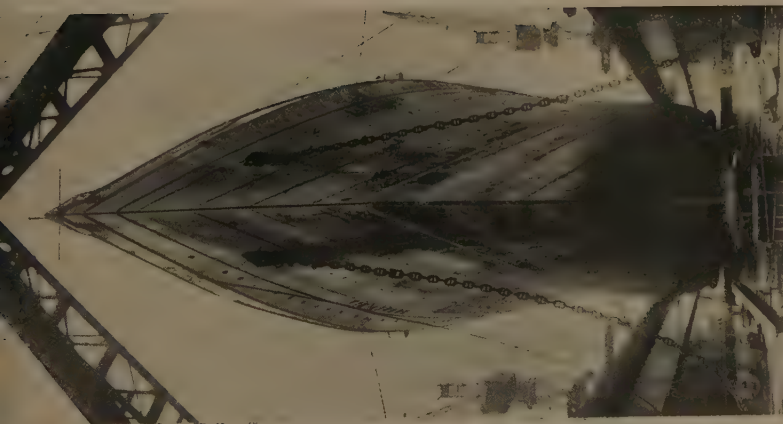
An additional call is added when the English Channel is reached, mails and passengers being landed at Plymouth in order to save a few hours

whilst she comes up Channel and enters the Thames. It is probable that Southampton may be added to the outward and possibly inward, calls of the Orient ships. The smaller ships of the company are placed on what is called an intermediate service. On this the same route is followed, and about the same time is taken, but this is attained by leaving out two of the European calls. As a rule mails are not taken upon the intermediate steamers.

The Orient, with other lines, plans its sailings for months ahead, even the name of the steamer is given. For short distance voyages there does not seem any great difficulty in doing this, because should a vessel be late on her inward trip she has sufficient margin to be ready to keep her next sailing; but on a long distance journey like this, with only two days at Brisbane, it seems rather difficult to say that the *Orford* will keep a sailing some months ahead. "How is it possible?" you may well ask. In the first place organisation must be kept at its very highest pitch. There must be no mistake in details, and the ships, especially as regards their engines, must always be in the very best conditions. But after sailing there may be gales and fogs, which will appreciably delay the ship and perhaps make her late at the first of her calling places. Usually something in hand is allowed for. Thus, if her speed is nineteen knots, she will be listed for eighteen, or even a little less. It is possible, therefore, for her speed to be quickened by at least a knot, which will mean a gain of something over twenty-five miles a day. Then the time allowed at the ports *en route* will be shortened, if at all possible. In addition, there is the home margin. Though the *Orford* will have but two



S.S. "Doric" on the slip
White Star Line.



"Mauretania" in Floating Dock
Showing her remarkable knife-edge stem.



"Mauretania" leaving port.
Cunard Line.

days at her one terminal, she will have a few weeks at the home port, so that she can be carefully overhauled and got ready for her next trip.

And that is how it is possible to plan months ahead. In the case of extensive repair being required, the reserve ship would take up the sailing.

CHAPTER XV

BUILDING A SHIP

THE building of a ship really begins in the drawing office of the shipyard, though before that stage is reached the kind of ship has been decided upon, its speed, and its capacity. Once these factors are decided, hundreds of blue prints are made for each complicated part of the steamer.

Where possible the drawings will be made full size; in other cases they must be carefully drawn to scale. In the case of liners or warships intended for speed, certain experiments will have taken place in a tank. The hull proposed will be modelled in wax, and then this model will be drawn through the water in the tank at varying speeds to test the resistance of the hull. By means of very delicate instruments the resistance encountered in its progress through the water is recorded on a chart, and by this test the lines of the hull can be finally decided.

The next department of interest is the mould-loft. Here we find a huge room, with a very dark floor. Men are on their hands and knees drawing on this floor as if it were a blackboard at school. They are transferring sections of the drawings into full size sketches, so that patterns may be made of the various plates, etc., into which the steel will have to be fashioned before it can be built into the

hull. If the drawings are incorrect in their reduced scale, this larger draughtsmanship will show the fault at once. When the lines of the ship are drawn upon the floor, the next step is to bring wooden templates to bend them to the desired angles. These then become the patterns to which the steel frames and plates must conform.

We leave the mould-loft and go to the slip upon which the monster ship is to be built. This is a modern yard, and the hull is to be built under cover. For this purpose there is a glazed roof, similar to that of a railway station, over the slip, and at such a height! Equipped with electric light work may proceed by night and day, should it be necessary, bad weather not interfering when a covered slip is used.

Under this great shed is the slip upon which the keel is laid, and the first part of that keel appears to be simply a succession of girders laid lengthwise. From this central girder ribs are brought outwards and then upwards. Soon, before our eyes, the hull is taking shape. The bottom of the ship is cellular in construction; perhaps it would be easier to describe it as a double keel. It is obvious that the bottom of the ship is its most vital spot, therefore, an inner skin is provided in case the first is damaged.

The building of the hull goes on rapidly, and if this were all that really mattered we should soon have our vessel at work. But very much has to be done after the hull is in the water. Frequently the fitting out, which includes placing the machinery aboard, takes longer than the building of the hull.

The day comes when the ship is to be sent down the launching ways—a day of great moment to the

shipyard. There is always the possibility that the huge hull may stick upon the ways. This has often occurred, though not so frequently in later as in earlier years.

Tons of tallow and oil are used to grease the ways, and, to make doubly sure, there is a ram fixed at the shore end of the slip, which can exert immense pressure should the hull show any signs of sticking.

At the proper moment a lady breaks a bottle of wine on the stem of the ship, she is named, an electric button is pressed and the huge mass moves down the launching ways. There are loud cheers, syrens across the river, and then little tugs take the now water-borne hull in tow.

The big hull is towed to a fitting-out berth, and here the engines and boilers are let down into the depths of the hull. Then furniture and other fittings are installed.

Six months go by, and the good ship takes her place in the fleet of her owners, after undergoing exhaustive speed tests.

These tests are very severe when the new liner is intended for the fast express traffic to the United States. It is essential that the speed laid down by the owners should be slightly exceeded on the trials because whilst these may take place on a river, or perhaps in the most favourable weather and general circumstances, the liner must be able to maintain her speed in practically all conditions of weather, excepting, of course, the severest of gales.

Two famous Cunarders went to sea for forty-eight hours each, and were kept at full speed for the whole of that time. They gave an average of a knot above the speed demanded by the Cunard Company. Not often is such a test as this imposed,

and it is quite certain that a ship which could come through it would not fail in actual service. As a rule the engines work much better after twelve months in service than on the trial runs.

All the first steamers were driven by paddle-wheels, operated by engines of the side-lever type. These in turn possessed oscillating cylinders, often of great diameter and stroke. Models of these early engines may be seen working, under compressed air, in the South Kensington Museum. They seem very ponderous, especially when we learn that the horsepower developed was estimated in a few hundreds for the biggest steamers. The boilers were of very low steam-pressure, and the coal bills would make a steamship owner of to-day pale with dismay. Speaking in a general way, the side-lever engines were copied from the big beam engines used for colliery and pumping machinery.

As the steamers grew in size it was seen that the limit of the paddle-wheeler was in sight. The paddles of the last Cunarders propelled by this means were nearly forty feet in diameter! Their huge size was all against them, especially as, in a heavy sea, they suffered very much from the pounding of the waves. Too often a liner came into port with its paddle-boxes smashed to matchwood, and the wheels themselves in a very sorry plight. So the screw-propeller was tried. At first the engines for driving the propeller were based on the beam engine model, often an adaption of the side-lever engine. Then, in some steamers, what was called the horizontal trunk engine was favoured, but in most the cylinders were placed directly over the cranks.

The change over from paddle to screw machinery was not an easy one for many of the old engineers.

One such stalwart was given the position of chief engineer on a new and fast screw liner. When the ship sailed he went down to the engine-room, finding the second engineer in charge. "I thought the order was for dead slow?" said the chief to his subordinate.

"Dead slow it is, sir."

"But look at the rate that piston is travelling. If that is dead slow they may find another man for this job, for I'll not have it. When you come to full speed the engine room will be filled with flying pieces of machinery." He had been used to the steady thud of the paddle-engine, and now found too much of a change. The designers themselves were rather anxious, for we find them gearing the machinery to reduce the speed of the reciprocating parts.

Strangely enough, on many of the liners of the 'sixties, wooden teeth were used upon the gear wheels, giving endless trouble. This was overcome by doing away with the gearing altogether, and no harm came to the ship by direct-acting cylinders.

All these engines were very wasteful of steam, which meant tremendous coal bills; the next step was to work for economy, and so the compound engine was introduced. At first high and low-pressure cylinders only were used, but later it was found that an intermediate cylinder could be utilised, and so the steam was used three times. The engines were called the triple-expansion type, and the next step was to make a fourth set of intermediate cylinders; thus the quadruple expansion engine, which was standard for many years on all our best liners.

It was with quadruple expansion engines that the crossing of the Atlantic was brought under six days; with them the Germans took the "Blue Ribbon"

from us in 1897. When, ten years later, they had to give it up it was to the next development in marine engines—the turbine. The *Mauretania* was engined entirely with turbines, developing 70,000 horse-power, and giving a sea speed of 25 knots.

Turbines have certain disadvantages, the principal being that they cannot be reversed, so that for reversing the *Mauretania*, two special turbines have to be provided in addition to the four driving the quadruple screws.

The *Olympic* marked another stage in marine engine development, made after a previous trial with the *Laurentic*; in the adoption of a combination of reciprocating machinery and turbines.

The reciprocating engines take the high-pressure steam, and, after reducing it to 9lbs pressure, it is passed to the turbines. When the latter have finished with it it has a pressure of exactly 1 lb! Such an arrangement makes for economy, though not so much for speed.

Now the whole future of liner engine development leans to the internal combustion engine, which has made such rapid progress in the last few years that there is every prospect of it ousting the steam engine for even the biggest liners. Few liners are built to-day exceeding 20,000 tons. The *Asturias* of the R.M.S.P.C. which is motor-driven, has reached that tonnage, the *Carnarvon Castle* of the Union-Castle has surpassed it, and larger Italian liners are running with motor engines.

So far the express service of the North Atlantic has not seen the motor liner, but there is every prospect of some of the intermediate vessels being motor-driven in the near future. Once established

on the intermediate services, it is almost certain that the motor will take its place in the express.

Experimenters are constantly at work to add to the safety of sea travel, and it is largely because of their successful endeavours that a liner is probably the safest place in the world, sharing with the train that very real honour.

One of the most wonderful and useful appliances yet discovered to help the liner is the submarine signal. In a fog the liner is like a blind person. For days on end it may happen that the captain is unable to glimpse the sun, and he has therefore to rely upon dead reckoning. In the open ocean, thousands of miles, perhaps, from land, this is difficult, but think what it means when land is near! How can the captain allow for the strong currents, which so seriously affect the course of the ship, drawing it most likely to a dangerous shoal, or to still more dangerous rocks? It is almost as dangerous to lay to where there is shipping as to go steadily forward. Here science has come to the aid of the navigator. Many years ago experiments were made on Lake Geneva to determine the speed with which sound travels through water. Two facts were discovered; the first was that sound travels through water at a much greater speed than through the air; secondly, that the speed could be measured by a small recording instrument. It was some years before the discovery was made of practical use on the sea, but at length the submarine signal bell was introduced. This may be placed upon a buoy, on a lightship, or again slung in a fitting at the bottom of the sea. In the latter case it will be swung to and fro by electricity, and in all cases its sound will be heard aboard a ship fitted

with a proper receiving apparatus. This consists of two small tanks, containing sea water, fixed below the water-line *inside* the hull; one on either side of the ship. In the tanks are delicate microphones, which pick up the sound of the bell, whilst from the microphones wires are led to the bridge where the officer on duty may hear the bell. The variation in the sounds of different bells will tell, not only their situation, but the distance at which the steamer is proceeding from their warning note. Liners at full speed may pick up the submarine signal at a distance of 15 miles from the point where it is being made. So, in a thick fog, the liner may proceed steadily, checking her courses in this wonderful fashion.

CHAPTER XVI

RUNNING A BIG LINER

LET us suppose that a new liner of great size has just come to her home port after undergoing her speed trials. A week hence she is to sail across the Atlantic on her maiden voyage. How is she prepared for that trip? What does she require?

First, there will be fuel. A few years ago we should have seen train upon train of coal wagons coming along the landing stage to which she is moored, and for a day or two there would be the shooting of truck loads of black diamonds into her big bunkers. A large liner would require at least 1,000 tons of coal for a trip across "the herring pond."

Coaling was an unpleasant business for everyone, for as the trucks shot their contents into the bunkers, a cloud of coal dust mounted upwards and every unprotected nook and cranny, including, of course, the cabins and their furniture, was covered with the horrible stuff. Then hours would be taken in cleaning down the ship. But now very few big liners burn coal, and most of those which were built for coal burning have been adapted for oil fuel. The change over is a great boon in every way, save for the colliers, who have been thrown

out of work through the drop in coal consumption due to oil being used.

As our liner is a new one she will be oil fired, so instead of 100 trucks of coal coming down the landing stage, she has an oil tanker lying alongside on her seaward side. Pipes are connected, and soon the thick oil, which is slightly warmed to make it flow more easily, is being pumped into the receiving tanks. These are so arranged that there is no difficulty in knowing when they have as much oil as they can safely carry. Besides an indicator, there is an arrangement which takes the excess oil to another tank. On our ship, and indeed on many others, the oil is largely carried in the double-bottom. Here it is not only safely out of the way, but it acts as ballast to steady the ship when her load is rather light. A very few hours serve to fill up all the available tanks; the oil tanker goes her way, and, without any dust or dirt, our big liner is ready as regards fuel. If it were necessary, she could carry sufficient oil for the return trip, but it is not thought worth while bringing a double supply over from the United States, when our ship is actually going there, and can take in all she wants within four hours of her making fast at New York.

We notice the care with which she is made fast to the landing stage. As she came in, the crew were ready with fenders, which are like large oakum eggs of considerable thickness; these are dropped in between the portions of the hull which would graze against the stone walls of the dock. Stout cables are made secure to stouter posts embedded in the stonework of the quay. A large board, on which is painted, in red, "KEEP CLEAR OF THE

PROPELLERS," is slung over the stern, gangways are run out from the quay to the decks of the liner, and all is now ready for loading. A fast liner, such as ours, does not take a great deal of cargo, and what there is has already arrived. Many railway trucks are in a siding, and from the fact that the trucks are carefully sheeted, we imagine that the goods are valuable. We watch the huge cranes taking up packages from the trucks (which have been brought alongside the quay by a fussy little tank engine), noticing on some the maker's names. A good deal of our cargo seems to be made up of woollen and cotton goods, but there are several crates of machinery, one or two motor cars of special design, and some hardware from Birmingham.

Next we notice the laundry coming aboard. There is not so much this trip as there will be next, as many of the articles, such as tablecloths, bed linen, and heaps of other clothes, are new and already aboard. Though our liners have extensive laundries aboard, the bulk of the ship's washing is done ashore, in what is called the turn-round period, in other words, in the few days in which she is in port.

Then come the provisions for the trip. It is well to remember that the liner at sea is a small town with sometimes as many as 4,000 people on board, and there is no shop round the corner, or a near-by town, where any shortage can be made good. It is, therefore, very necessary that a proper list of requirements is made out, and that everything on that list is checked when it comes on board.

First, there is the meat store, in charge of the butchers. These men have more than 50 oxen,

150 sheep and lambs, 150 pigs, and close upon 5,000 birds, ranging from turkeys and fowls to grouse, pigeons, and even smaller birds, according to the season of the year.

The flour is counted in by the ton, so is oatmeal, potatoes and other vegetables; and then, by the cwt., there is coffee, tea, rice; and, by the thousand, the various bottles of minerals and beer. Look at a day's menu of a first-class hotel, and it compares favourably with that of an Atlantic liner.

Everything is now aboard, save the passengers and their luggage. The latter begins to trickle through as train after train arrives at the dock station.

Some of it is marked for cabin use; the rest goes down into the depths of the hold, there to remain undisturbed until New York and its Customs officers are reached. The luggage is taken aboard by means of an endless band. Bags of mails are arriving, too, as the time draws near for sailing. These are dropped into a large net, which is hoisted aboard to lower its contents into a shute to the mail room.

Next comes the third-class passengers train, and the bustle increases. Follows soon after the next special with the second class passengers; later comes the first class train. The hands of the clock move steadily onwards to noon, the hour at which the big liner is to set out on her long journey.

Steam has been raised, and some of it is escaping through the pipes which run up in front of the huge funnels. Ashore one does not realise how huge are these funnels, but standing right under one, it is possible to believe that two big motors *abreast*

can drive through any of the four without touching each other.

Just as the hour of noon is about to strike from the neighbouring church clock, the last gangway is drawn ashore; the visitors to the ship having departed on the "all ashore" bugle.

A signal is made, and now the voyage has actually begun. The mooring ropes have been cast off, and now the tugs are busy pulling and pushing the mammoth away from the landing stage.

It seems, at first, as if the puny looking little fellows will never move so great a ship, but they do, and, very slowly, we see the ribbon of water between the liner and the quay ever widening. Very gently she is taken into the fairway, the tugs cast off, and then the ponderous turbines begin their work—nor will they cease for six full days and nights, save for that short call at Cherbourg for Continental passengers.

The pilot is in charge and remains on the bridge, temporary master of the ship. Soon the French coast is sighted and the harbour at Cherbourg is entered. Many more passengers board the liner from a tender, then once more the great vessel heads for the open sea.

What of the men who run the ship? How is the work divided up?

At the head of affairs is the captain, who is to the ship what the commanding officer is to an army. His responsibility is enormous, and no one who possesses a nervous, or an irritable temperament should ever try to become a sea captain. On his shoulders rests the responsibility not only of the ship, but her passengers, her crew, and her cargo. Should an accident occur which delays or endangers



White Star "Homeric" at sea

the ship, though the fault may not be his, he is held to account.

In addition to the captain there are seven officers, the senior being the chief navigating officer. The others rank first, second and so on. Besides the navigating officer three of the officers possess full certificates, and when vacancies occur they are ready for appointment as captains. One senior and one junior officer, at least, will be on duty together, and they must note everything that happens.

Some members of the crew will be allotted to the important post of look-out. This will be done either from the crow's nest, or from the forecastle, according to the weather conditions. A great deal depends on the lookout, for though the ship may be driving along at full speed in clear weather and without a sail or blot of smoke in sight, there are still dangers.

There are possibly floating, but almost submerged, wrecks in the path, into which if a liner crashed she would be crippled even if not sunk. Many a good ship has disappeared entirely without a survivor to say what was the cause of the disaster. Often a small timber-laden sailing vessel has met with a gale, been dismasted, and then been abandoned by her crew, only to form the worst possible trap for a fast liner, the timber keeping the water-logged vessel afloat. So many cases of this description occurred that the United States Government commissioned a special vessel to go out and search for these dangerous wrecks, with instructions to blow them up if they could not be towed to port. Or again, a submerged iceberg may be lurking in the path; the biggest disaster in steamship history was caused by a partially submerged berg.

Every incident which occurs must be entered in the ship's log, with particulars of the position of the ship when the event happened. It may be simply the passing of another ship, or floating wreckage, or ice.

The whole of the crew is divided into two watches. The method of dividing the watches is rather confusing to a landsman, for whilst it is four hours off and four on, there is one period where it is eight hours on. This is done to allow of the crew having eight hours in their bunks every other night. To do this the watch from 4 p.m. to 8 p.m. is divided into what are called dog watches, each of two hours.

The captain of a big liner does not take a watch. His responsibility is so great that he must be free from all routine work, so that he can deal with every detail of the management of the ship.

The engineers are the most important members of the crew of the liner; no longer is it the men on deck who see to it that the great ship is driven along at her best speed. Between 800 and 900 men are required for a big liner, and of these more than a fourth are in the engineer's section. A much larger number would be required for a coal burner, but one of the changes made by the use of oil fuel is a big reduction in the stoke-hold staff. Thus, the *Aquitania* when she first put to sea, in 1914, as a coal burner, had nearly 300 men in the stoke-hold alone. The whole of the engine-room staff is under the control of the chief engineer, and he has about thirty engineer officers to help him in the more important sections of his control. There are twenty men who are termed "greasers," and their work may be guessed from their name; a liner wants a great deal of greasing when running at 25 knots!



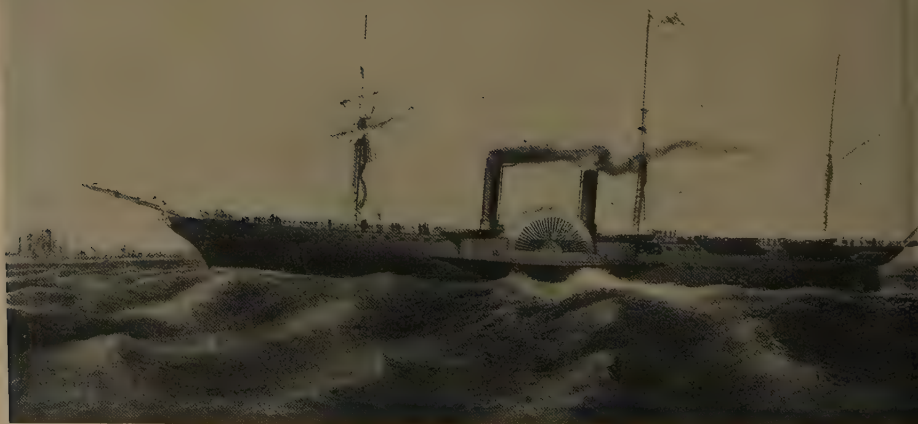
“ Majestic ”

In dry dock at Southampton (the largest in the world). Night work in progress.



"Orient"

The crack ship on the Australian trade in the early 'eighties and the model for that service for many years afterwards.



"Solent"

R.M.S.P. West Indian steamer, at one time commanded by Captain Jellicoe, father of Admiral of the Fleet.

Those thirty engineer officers are not all employed in looking after the driving machinery. There is the ventilation engineer, for instance, who sees that there is plenty of fresh air circulating through the ship. Unless care were taken some cabins would be stuffy and hot; others cold, and so on, but so important is ventilation that there are charts, corrected each hour, showing the exact conditions of all departments of the ship as regards air and warmth. There are deck engineers, who have to see that the hot and cold water supply is satisfactory, for there are numerous baths and lavatory basins throughout the ship, besides that magnificent swimming bath down below. These engineers are also looking after the drinking water system, the pumps, the fire appliances and their water supply. In addition, they must attend to any oil engines and the electric lighting plant, the latter sufficient to light a town of 100,000 people. There are over 200 miles of cable, 700 miles of wire for switches, and nearly 100,000 insulators in the ship. Each night there are 10,000 electric light bulbs glowing with power which has been created on board; many of these are always burning.

This wonderful power plant drives nearly 200 different motors, each having a distinct use such as peeling potatoes, washing dishes, and many other things in the kitchens; working fans, lifts, whistles, searchlights, telephones and the wireless. What a wonderful fairy is this invisible electric current without which a modern liner is helpless! Of all the improvements introduced aboard ship in recent years, nothing has been so good as electricity.

Fresh from all these wonders below take a walk through some of the cabins and saloons of this fine

new liner; beginning with the first class section. Here is the restaurant with its high ceiling, painted by a well-known artist. In order to look at the painting more closely we ascend a beautiful staircase, such as one may come across in a big country mansion, and we find ourselves in a gallery which runs right round the restaurant—a huge room. We pass on to another large apartment known as the Grill Room, and we notice that it is furnished in Jacobean style. The big smoking-room comes next with plenty of beautiful oak, the floor being laid in this typical English wood. Next we come to the huge lounge, which has been built so that it may be used for concerts, as a theatre, or a ball-room.

The bedrooms—no longer can we call them cabins—are just like those at home, with bedsteads instead of bunks. Then to the drawing-room, huge again, but very comfortable. Next is the café, which has a nice verandah with flowers growing, ivy climbing, and neat trellis work—very like the gardens at home.

The gymnasium has a vaulting horse, trapeze, and all the other appurtenances of a good “gym.”

There are second and third class sections of this huge ship. The second-class is as good to-day as the first was thirty years ago—and the third is far better than the first of sixty years back.

The engine-rooms have been described as the heart of a liner. Here are the great turbines, humming away with their pleasant song, telling of good work accomplished every moment. There are four shafts to drive four screws, but there are six turbines, two of them reserved for going astern when necessary. Turbines cannot be reversed.

We pass on to another very interesting department of the big liner—the brain of the ship. The bridge and chart-room are situated on the topmost deck, and from this point the huge vessel is really governed. By means of loud speaking telephones every part of the ship is in communication with the officer on the bridge. The electric fire alarm would instantly give warning of a fire wherever it occurred, and here, too, is concentrated the main steering machinery, though the liner can be steered from three other positions.

There is also the delicate apparatus which picks up the submarine signals sent out by lightships; must useful are these signals in case of sudden fog.

From the bridge we see the lifeboats—in all ninety—providing accommodation for the maximum number of persons carried. Two of them are motor lifeboats, over thirty feet in length, and having a full equipment of wireless. In the event of disaster overtaking this splendid ship these motor boats would act as mothers for the rest of the big fleet of lifeboats.

From mast to mast stretch the strong wires which mean so much to the modern ship; they are picking up all kinds of messages from other ships, and from the land. Tucked down below there is the wireless cabin, where the operators write down news items which will appear in the little newspaper printed each day aboard the liner. The printing press is used for the menu cards which are renewed for each meal.

Cooking is done under perfect conditions, for there is always a good supply of steam and electricity available aboard a liner, and all this makes for satisfactory cooking. Everything is spotlessly

clean, everything seems well ordered on this floating town.

There is no difficulty in arranging plenty of sports and other amusements. To-morrow there will be a cricket match; to-night a concert, following a deck quoits match. On Wednesday there are to be sports, Thursday more cricket, tennis and even golf.

For wet days there is the library; for the children their own particular room, with all kinds of toys ranging from a rocking-horse to a model house large enough to play in.

CHAPTER XVII

FLOATING DOCKS AND SALVAGE SHIPS

At least once a year the more important vessels, such as the liner, must go into dry dock in order that the under-water portion of the hull may be examined. The coating of sea-weed and shell-fish, is also cleared off the plating. These offer resistance to the swift passage of the hull through the water, therefore, the annual dry docking is necessary for scraping. At the same time a careful examination of the hull takes place, any weak spot receives attention and one or two coats of paint are given to act as a preservative.

Practically every British port of any size has proper dry-docking accommodation, but there are many British ships which rarely, if ever, come home. This is due to the fact that a great deal of our shipping is employed abroad, running perhaps for years between ports which have no graving, or dry dock. At some ports it is not possible to build a dock of the usual type, therefore the floating dock is introduced. This is a huge box of steel, usually with the two ends open. The bottom and sides are comprised of a series of water-tight tanks which are flooded when necessary, and there are powerful pumps aboard the floating dock to empty the water from these tanks.

The floating dock had an interesting beginning. Many years ago an English captain found that his ship would have to lie some weeks at a Russian port. The captain knew that the hull of his ship was badly in need of cleaning, and possibly repair too. But there was no dock into which she could go, nor could the vessel be hauled ashore, as was done with the smaller craft. Yet the opportunity was too good to be lost, so the Englishman cast about for a means of carrying out the work. He found at the port an old hulk, larger than his ship, and this he was able to hire for quite a reasonable sum. He and his men then cut away the stern, admitting the sea, the hulk settling down on the bed of the harbour. Then the ship was warped into it, the stern made good, temporarily, and the pumps got to work until the hulk gradually rose from the sea bed, the ship left being high and dry inside.

What was accomplished with the old hulk is really what happens with the modern floating dock. But whilst it took hours of patient work with the hand pumps in that improvised dock, the present-day type can be sunk, take in its ship, and rise, pumped out, in quite a short time, a mere matter of hours.

Britain is the home of the floating dock as regards development and manufacture, and though they are now found all over the world most of them have been built in these islands. Their construction has now been brought to quite a fine art, and there are many kinds, some of them very wonderful.

The "Depositing Dock" deals with ship after ship, placing them on "gridirons" where they can be repaired without keeping the dock itself out of action.

It is necessary that several gridirons shall be built; upon these the depositing dock will place or take off ships as needed. The floating dock itself has only one side, from which juts out a series of fingers; the gridirons on the river or harbour side have a similar number of fingers.

The ship comes up the river alongside the depositing dock, which sinks almost from view by filling her tanks. The ship is now towed, or warped, over the hidden fingers, and is made fast to the side of the dock. At once the pumps on the dock begin their work of emptying the tanks, and soon the vessel is high and dry upon the fingers. Then tugs take charge and bring the depositing dock and its burden to the gridiron, upon which it is desired to leave the ship for repair. With great care the fingers of the floating dock are pushed in between the similar fingers of the grid. Then water is let into the floating dock's tanks, and she gradually sinks and is pulled away, leaving the ship upon the fingers of the gridiron.

The dock is now ready to deal with another vessel. When the work on a ship is completed, the depositing dock comes back to receive its burden, conveying the vessel into deep water, the previous operations being reversed.

The work of the salvage ship is especially interesting. There is the ship lying fathoms deep in the sea, the divers reporting that she is well worth getting up.

Here the salvage ship must do her part, and a hard and wearying part it is. So much depends on weather and tides, and very careful calculations are necessary if a successful raising is to be made. The divers, with boots and suits weighted to keep

them down, having surveyed the wreck, must carry out some temporary repairs to the hull, also passing heavy steel hawsers underneath it.

Then, possibly, two big pontoons will be sunk on either side of the wreck. These will be pumped out, and in most cases they will lift the sunken vessel, very gradually, a foot or two from the bed of the sea. As they lift, they and their burden are towed very slowly towards the shore. The pontoons are sunk again when the wreck touches bottom and the operation repeated until the stricken ship rests quite near the shore, with her hull above water when the tide is low.

It is very heartening for the salvage men when the dark hull of the lost one begins to show itself amidst the scene of activity. When once the hull is out of the water at low tide, greater progress will be made, and temporary repairs may go ahead as fast as possible, until, having been pumped out, the ship is once more safely afloat, ready for towing round to the nearest repairing yards. Reaching here she will either be sent into dry dock, or perhaps the depositing dock will take charge.

Then comes a complete refit, and the lost steamer will be as good as ever again.

Some wonderful things have been done by our salvage ships. Many a secret of the German Navy was learned by getting up their code books, which had sunk with their submarines.

Perhaps the biggest thing the salvage ships have yet undertaken is the raising of the German Fleet, which was sunk by their crews whilst at anchor at Scapa Flow, after the ships had surrendered.

As warships, the German Fleet was useless, but worth a considerable amount as scrap material.

They were a danger to other ships, and their raising was an invaluable experience for the salvage ships and their wonderful machinery.

Amongst the latter there is a type of pump which draws up a ton of water a minute!

Long before salvage pumps can be put to use, the divers must go down to the ship and get to know all about her. Perhaps they may have her plans before them; this saves a lot of time. The divers *must* know every detail, the number of cabins, the weight of the machinery aboard, how the hull rests on the bottom, and of what the bottom is composed. This latter point is most important, since if the sea floor is soft the ship will have sunk fairly deep into it. If rocky the chances are that several sharp points of rock will have pierced the hull. Should the rocks have holed the ship, it will be necessary to cut out those jagged points, and place patches over the damaged plates. Here is a ticklish piece of work, and unless very great care is taken the ship will be greatly damaged. The cutting away of the rock is usually done by dynamite, yet so well is its use understood that the rock will be removed as neatly as if a large pair of scissors had been used. It is often desirable to cut a ship into two, or more parts; again the dynamite charge is used, and the work well done.

A great boon to the diver is the powerful electric light which he has at his command. Before such powerful lights were used the diver had to grope his way painfully about in complete darkness. Very often he would fall down an unseen hatchway, or he would stumble over something which he could not observe in the darkness. Very often, too, the fall would cut his air pipe, and unless

he could get quickly to the surface his life was forfeit.

The sunken German fleet presented some interesting problems, as some were lying upright, some on their sides, and at least one monster was upside down. The salvage of this ship proved a difficult job, because the masts and deck machinery had to be cut away before starting on the actual raising of the hull. Inside everything was upside down for the diver, the ceilings being the floors. The boilers and other heavy portions of the ship's furnishings, such as guns and capstans, had in many cases broken loose, so that it was very difficult working on a ship which had "turned turtle."

The diver must be able to cut through such masses of steel, and he is therefore equipped with blow-pipes similar to those seen where tramways are being laid, or repaired. It seems difficult to believe that such a blow-pipe will work under water; we are so used to water putting out flame, or cooling a hot piece of metal, that the use of heat under water is very marvellous. But our engineers have invented a cup arrangement which surrounds the blow-pipe, and it works quite well, a jet of air keeping the water away from the nozzle of the blow-pipe. Metal can be burnt through under water with this marvellous invention, but the glare of the flame, even in the darkest water, is so great that the diver must have a shade for his eyes.

How does the diver put a patch on the steel hull of a sunken vessel? Here air-driven tools are utilised, and there are pneumatic punches and riveters very similar to those found in a shipyard.

The diver drills holes through the hull round the space where the patch is to be put on and then

he rivets the prepared patch in place. This is usually of steel, but all kinds of materials have been used at a moment's notice, canvas and wood having served their turn for patches.

In the case of the ships which are standing upright in the water, huge coffer-dams are built round the hull.

A coffer-dam is really a great wall of wood, or of iron, built right round the hull of the wreck. It is usual for the erection to be built upon the ship itself, plank by plank, until the wooden wall comes right above the water. The divers now close every port-hole and opening in the ship, and the powerful pumps are set going. If the ship sank near to the shore the waiting tugs will at once get their tow-ropes aboard, and as the ship rises gradually from the bed of the sea, she will be towed, very slowly, towards the shore. If she sank near a harbour she will perhaps be taken in at once, just as she is, and dry-docked. But the chances are that she was some distance from a dry dock when fate overtook her. In that case the tug will tow her to such a position that she will be left high and dry at low tide, and she will be just afloat when the water is high. Then the coffer-dams are taken down, temporary repairs made, and she will be towed to the nearest ship's hospital, there to be reconditioned.

CHAPTER XVIII

SOME STRANGE SHIPS

SOMETIMES a ship is observed with what looks like five, six, or even more, curious masts. As there are no sails upon them, nor rigging to hold these sails, and the funnel is sending out plenty of smoke, we may have wondered what kind of vessel this would be. It is, of course, a cargo ship, but the masts, which are there to support the derricks, do not tell us what kind of cargo our vessel carries. These derricks are very important because the speed in loading and unloading a ship is of the greatest moment. Not only will she make many more voyages, and thus earn more, but the dock charges are rather high; it is cheaper to be at sea.

Another cargo boat, which has numerous masts, is the turret ship. This type of ship appeared some thirty years ago, and when they were introduced quite a number of seafaring men laughed because they were so different to anything seen previously. But they have made good, and may be seen in all parts of the world.

The main idea in the planning of the turret ship is to secure as far as possible, an unbroken hold for accommodating the cargo.

The hull of the turret ship, just above the water-line, takes a curve inwards and this curve is so sudden

that a kind of miniature deck is provided. It is very narrow, running the length of the vessel; from this harbour deck, as it is called, the sides of the hull go straight up again in the ordinary way.

From above, the deck appears to be of an ordinary type, with the usual fitting, but it does not run the whole width of the ship, being in fact only a little more than half the actual beam of the vessel. In a heavy sea, the harbour deck is usually under water as the ship rolls, but as it is fish-backed (i.e. rounded), the water runs off freely, and the vessel gets back on to a level keel with ease.

In the case of what is called a well-decked cargo steamer, a heavy sea means a huge weight of water coming aboard, which it is difficult to get rid of promptly.

On many of the turret ships timber is secured, by strong chains, on the harbour deck.

Another remarkable kind of vessel is the train-ferry steamer. They were found extremely useful during the war for transporting material to France, and they are likely to be seen more and more in the future. Already a service of train-ferries between Harwich and Belgium is working. Here we have a steamer of considerable beam with ends which let down, though in some cases it is only the stern which has an opening.

Inside the train-ferry steamer there are two, or more, lines of rails running side by side, upon which sections of a train can be run.

In the biggest kinds there will be two decks so that the accommodation for trucks and coaches is doubled. The locomotives are left behind. At present the advantage of the train-ferry between this country and the Continent is found for goods,

and it is doubtful if passenger traffic will be handled. The train-ferries are slower than the cross-channel steamers, and the time taken up in running the train aboard, dividing it into sections, landing it, and coupling it up would hardly be worth while for passenger traffic. But for goods trucks, which can be packed, say, at Birmingham, and go right through to Vienna, there is a great saving of time because, not only is there a great deal of time lost in re-packing from truck to steamer and steamer to truck, but there is the expense, and often considerable damage is occasioned.

Between Sweden and Denmark very large train-ferries are at work; many of them having been built in England.

Another remarkable ship is the vessel which takes out our cables for telegraphing between countries which are separated by miles of ocean. At one time it was customary to buy any kind of ship and convert her to cable work, but now there are builders who specialise in this type.

Such a vessel is the *Colonia*, which was built upon the Tyne for cable laying. Whilst at first glance one could not tell her calling, a close examination would reveal the gear, which is used for paying out the cable, the cables themselves being stowed in circular, watertight holds. This ship completed a remarkable task in circling the world with the first all-British cable, so that she helped to make history. The weight of the cable carried amounted to 8,000 tons, so that these vessels are quite large. And they must be very seaworthy, since they are on service on the ocean often for months together.

The ice-breaker is a curious vessel. To build a vessel strong enough to smash her way through

ice many feet thick is no slight achievement, but this has been made possible by the great advance in shipbuilding. If an ordinary steel-built vessel were caught in the ice she would assuredly be crumpled up.

The ice-breaker must not allow herself to be so caught, but, supposing she were, then she must be strong enough to withstand the pressure, and she would in all probability be forced right up on to the ice without so much as a rivet giving way.

The dredger is used to deepen a channel so that steamers coming up river, or into harbour, may not touch bottom and most likely remain fast. It is really wonderful what has been accomplished by this type of ship. There are many harbour entrances which would soon be silted right up with sand were it not for the constant efforts of one or more dredgers. At the mouth of the Mersey dredgers must be constantly at work. A stretch of sand, called the bar, forms an obstacle to shipping, and the tides would pile still more sand not only on to the bar, but also in the channel, making the latter useless, if it were not for the work of the steam dredgers. As it is big ships must often wait outside the bar for the tide to serve them when coming into port, or proceeding to sea. The buckets travel on an endless chain through an aperture in the keel of the dredger, and they dip into the bottom of the river or sea and bring up whatever is found; usually it is sand, but the powerful modern dredgers will cut into rock as well. Many a dock wall, which is no longer required, and cannot be reached in the ordinary manner, is cut right away by a powerful dredger. The "spoil," as the material is called, is dropped by the buckets into the hold of the dredger,

or, in some cases, to lighters moored alongside the working craft; then, unless required on land, a journey out to sea is made, and the "spoil" heaved overboard.

In order to avoid bringing up the "spoil" from the hold of the dredger in the way that cargo is handled, the sand, etc., is placed into what may be best described as lockers, and these have bottoms which can be released, so that it is only a matter of a few moments to empty their contents, once the open sea is reached.

The ordinary bucket type of dredger would not be able to tackle a rocky river, or a sea bed, so the buckets are fitted with teeth; others are fitted with "grabbers," such as may be seen on excavators employed on making new roads or railways; or again, where there is simply mud or sand to be removed, instead of buckets, suction pumps are employed.

Perhaps the most wonderful dredgers found in the world are employed on the task which we have already mentioned—that of keeping clear the Mersey channel. A typical dredger can suck up from the bottom of the river 10,000 tons of semi-liquid sand in less than an hour, then, at quite a good speed, she proceeds to sea and in a few moments all that tremendous load has been returned to the ocean, which, in turn, promptly begins to move it back to Liverpool; if not this sand, some remarkably like it.

Lightships are very useful vessels which have to be immensely strong to stand the buffeting of all kinds of weather. Indeed, it is a constant source of wonderment to the landsmen that they are able to keep the sea when so many larger ships are driven



A Paravane being hoisted out

towards the close of the war all warships carried a pair of these paravanes, towed in the water by steel wire rope, one on each side near the bows. They picked up and cut mine moorings, so that the mine came to the surface and was destroyed.



Explosion of a depth charge

These were used for the attack on submarines and were perfected during the war. They were generally of two sizes, with 300 lb. or 120 lb. of high explosive, and from 4 to 40 were carried by each British destroyer. To the right of the stern of the vessel, from which this view was taken a depth charge can be seen.



S.S. "Sicamous"
British Columbia Lake and River Service.



Standard A type cargo steamer. 8,300 tons.

for shelter, or are even overcome by the waves. Near the coast there are frequently stretches of very shallow water, or a reef of hidden rocks, highly dangerous for shipping. In many cases they are near enough to the land for a lighthouse to be built to warn the skippers of craft using those waters, but there is always the danger of fog obscuring the light, especially if it be placed at too great a distance from the danger spot.

The only thing to be done then is to moor a lightship on the outer side of the danger zone.

What kind of a ship is it that will ride safely through any storm which comes, and more particularly ride at anchor? A stout vessel indeed, built from a special design which makes her hull very strong, and yet gives her lines which will take kindly to the sea.

Lightships are easy to recognise, since they are usually painted red, and have their names in white letters upon their sides; then, of course, there is the unmistakable lantern on the rather stumpy mast.

The greatest care must be taken in securing the lightship to the place she is to guard, no ordinary anchor would do here. If she were to break loose she would be at the mercy of the sea, and it is most likely that she would break loose in a gale—and that would be the end of her, and perhaps the end of several other ships, who would miss her warning light.

Several methods of anchoring her are adopted—all methods depending on the stoutest cables which it is possible to use. The anchors are of a special kind, called mushroom anchors, resembling a parachute used upside down.

No risk is taken even when the anchors have been dropped and tested with a pull far beyond what they will be expected to hold; the men on board are supplied with plenty of spares which they can use during the worst gales of winter when the duties are very trying. The ship is never still, and few landsmen could stand that constant pitching. Each lightship is allotted a dozen men, of whom seven must be always aboard. In summer it is rather nice aboard a lightship, because the quarters are pleasant, with plenty of room, and the cabins are beautifully kept—just like those of a man-of-war. But the winter months are very trying.

The lights of each ship must be totally different, or our merchant skippers would be misled. In some cases the lanterns have coloured glass, but it is usual to have a white light with some special design; it may revolve, or it may flash and then darken in quick movements. The latter are controlled by clockwork, which must have regular attention. The lanterns are lighted by oil lamps, and the oil is kept in huge tanks. So far, electricity has not been found so reliable as the old-fashioned lamp oil.

Powerful as is the lantern, in fogs it is almost useless, and then a syren has to be blown at frequent intervals. Failure to send out that warning blast might easily mean that an oncoming steamer would run the lightship down. In addition, many lightships are equipped with apparatus for sending out submarine signals, these being picked up on instruments on the liners.

Fog is the worst enemy of the lightship men. They get used to storms, and are prepared for the tossing they get, but it is nerve-racking to be

surrounded by a thick belt of fog from which, at any moment, a ship may suddenly appear, and cut the lightship in two. This does not often happen, but the possibility is always present.

Many of the lightships are now, by means of a cable, able to send messages to the land, either by telephone, or by telegraphy, and others are being placed in wireless communication with land stations.

The Trinity House steamer which inspects the lightship is also employed to bring her in for refit.

CHAPTER XIX

SOME FAMOUS WRECKS

ALTHOUGH wrecks are frequent enough in these days of steam they are not nearly so numerous, in proportion, to the number of ships employed as in the days when the sailing vessel was supreme upon the ocean. If one cared to go right through the long list of the famous clippers, which raced the earliest liners, it would be remarked how often their end came by running, or being driven ashore.

Before the clippers came the Indiamen, both East and West. One of the latter was the *Clarendon* which in a gale got into one of the numerous bays which indent the coast of the Isle of Wight and could not work out again. Long before any attempt at rescue could be made the splendid ship came ashore on those cruel rocks, and, in five minutes, she was a complete wreck, only three of her people managing to reach the shore, which was but a biscuit toss from the rocks upon which this good ship struck.

An East Indiaman, the *Halsewell* was driven ashore in 1786, coming broadside under a tremendous cliff whose front was quite unscalable. Strangely enough the vessel came to rest right in front of a large cavern, and many of those on board thought that their only chance of life was to get from ship to cavern. The *Halsewell* was taking

many soldiers out to the East and there were also many women and children on board. When the ship struck the latter were assembled in the round house upon the deck and told to be of good cheer as help would soon be forthcoming. Instead of help coming from the land, disaster came from the sea; the ship broke in two and the round house and all its occupants were washed away, not a soul escaping. Many of the crew, followed by the soldiers, flung themselves into the sea and were carried into the cavern. But they had apparently exchanged a quick for a slow death. They climbed the slippery sides of the cavern as far as they could, having a poor foothold upon the slimy rocks which the sailors knew would be totally covered as soon as the tide rose again. Some retreated to the fullest extent of the cavern, but the same tell tale tide markings were there.

The position of the wreck made it impossible for it to be seen from the shore, and no boat could have lived in the narrow approach to that cave of the sea. There was just one slender chance; it might be possible to find a way up the cliff side when daylight came. The hours dragged slowly, and inch by inch the tide began to rise; the cries from the wreck had ceased, all had perished save these poor fellows who stood shivering on that slippery rock. Some were overcome by cold and slid down into the sea and so perished. Three men started out upon that perilous attempt to gain the cliff top, and two actually reached it after a climb up 200 feet of almost perpendicular rock when one false step would have sent them to death. The second officer of the ship was one of the three and he got almost to the top and then could get no farther, nor

could he trust himself to descend. Fortunately, the other men were able to drag themselves to a house and tell something of their awful experience. Ropes were brought and the second officer pulled up the cliff. Just as he grasped the rope the very piece of rock upon which he had been standing became detached and went hurtling down into the sea, so he had another escape to add to the many of that long drawn out night.

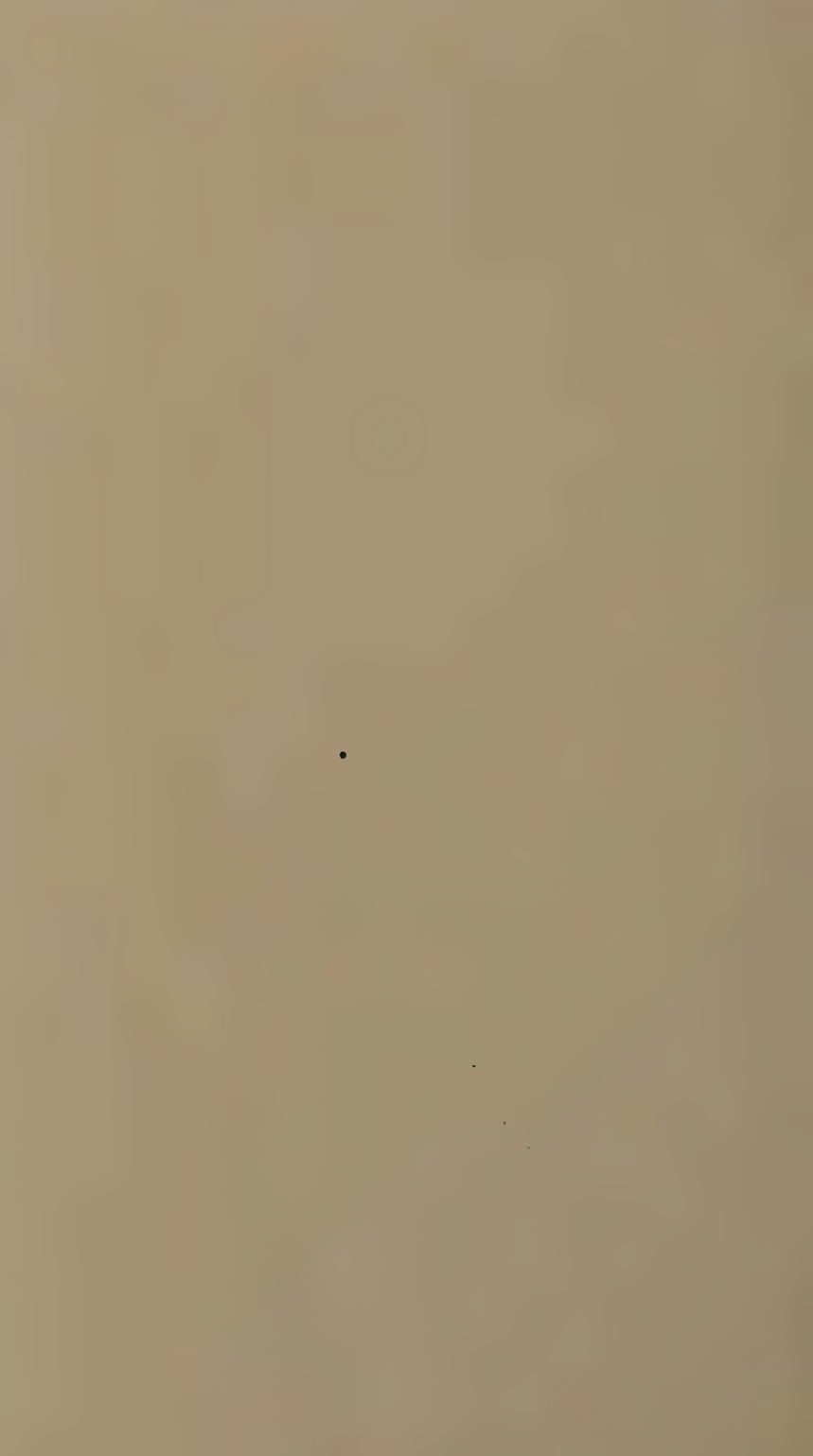
The country people came in dozens bringing ropes, these were let down the cliffs and one by one the poor fellows were drawn up from the cavern. In jumping for the ropes many missed their footing and were lost; in all seventy men were drawn up this cliff, but amongst them was not a single passenger; nor did one of the latter escape from the *Halsewell*.

One of the most terrible wrecks on record, more from its after effects than the manner in which it took place was that of the *Medusa*, a French vessel taking settlers and soldiers out to the African colony of Senegal. It is amazing to find that the man appointed to the command of the *Medusa* knew so little about his job that he allowed a passenger to undertake the direction of his officers as regards navigation, simply because this vain-glorious passenger was a man of influence, and professed to have a close knowledge of the dangerous coast to which they were approaching. Instead of keeping well out to sea the *Medusa* attempted to cut off a corner by hugging the coast. She grounded upon a reef some sixty miles from the African coast. At once there were the wildest scenes of confusion on board; the weak captain having not the slightest control. Had he been prompt in lightening his ship by throwing overboard her guns and stores she would



"Victoria"

Hull Steam Shipping Company's steamer built in 1837. A most unlucky vessel.



doubtless have floated off the reef quite easily as she had touched very lightly, remaining firm because of her weight.

Men ran screeching about the deck, trying to find the passenger, who had asserted so much when he knew so little; this man would have been thrown to the sharks very quickly, but his good sense told him to hide, which he did so effectually that the searchers could not discover him.

The cries of the women and children were added to the imprecations of the men; the crew got at the spirit locker, and soon they were drunk and incapable of action had it been called for. Then a gale arose and the poor *Medusa* looked like being battered to pieces in her helplessness.

There were over 400 people aboard and some of them were the gaol clearings of France, shipped to Senegal as soldiers to get rid of them.

Worse still, there were boats for less than half the number of people on board. A wise captain would have sent the women and children away in the boats at once—or at least so soon as the gale had subsided, and then arranged for them to come back for the rest of the complement of the ship. At a pinch the six boats would have cleared the ship in two trips of 120 miles each.

It so happened that the chief passenger aboard was the governor of Senegal, and he seems to have taken charge of the ship. He proposed that a large raft should be made upon which those of the ship's company, who could not get into the boats, should embark. Then the six boats should tow the raft to the nearest land. Here the whole company should form a caravan which should proceed along the coast towards Senegal.

Secretly the governor had no such intention of towage, but the raft was made, the people embarked, and a pretence made of taking it in tow. Once the raft was away from the ship two boats containing the governor and other important personages made off, sailing direct to Senegal, calling out that they would send assistance. The rest of the boats made straight for the shore, the people on them calling out that they would come back as they found it impossible to tow that huge raft with its 200 people. It was a horrible business throughout, badly managed, and showing human nature at its worst. The raft was badly built; so soon as the people were on board it began to sink, and to lighten it they had to throw overboard their provisions, and even then they were standing up to their knees in water.

There now ensued upon that raft the most terrible series of incidents that it would be possible to imagine, and quite impossible of description. The men grew frenzied in the first night and tried to throw overboard their officers; fighting went on throughout the darkness, men were thrown or leapt into a shark-infested sea, and even the one woman no board was thrown into the sea, to be rescued by her husband. In the morning the number of persons on board the raft was greatly less and there were piles of dead men; these were thrown to the sharks, too. Then came a storm, tipping the raft up at such an angle that each time she rose some of her people went to their death; some threw themselves into the sea as presenting a more merciful death than the long drawn out horror of this awful raft.

And so through several days this horror went on, made worse by the fact that the frenzied men aboard had deliberately flung the water barrels into the sea.

At last from 200 people a meagre fifteen remained alive upon this tossing mass of timber yet for another fortnight they had to wait for relief when a search vessel found them more like starved animals than men—15 out of 200! So long as those survivors lived they bore the marks of that awful three weeks upon their faces, and in the night time they had dreams which were almost as bad as their actual experiences. The same ship found the few men who had stayed aboard the wreck; these, too, were in the last extremity of distress though they had not starved.

The party who had reached the shore made a long and perilous journey along it to Senegal, whilst the two boats which made direct for that place, after deserting their fellows in so cowardly a fashion, were the only people who did not suffer; perhaps their consciences troubled them in years to come, and so they paid in that fashion.

One dark night the good ship *Mohegan* was ploughing along the channel, outward bound with emigrants for America. In a sea mist she got too near the Cornish coast and went upon a hidden rock. The latter tore open her bottom and she began to fill, but so long as she remained upon the rock there was no great danger to those aboard her.

Unfortunately, within a short time of striking, she slipped from her resting place, and sank like a stone beside it, taking with her the greater part of her large company. Within a few months she had a companion, though fortunately not with the same dire results. The splendid three-funnelled liner the *Paris*, a blue ribbon holder of thirty years ago, had also got off her course and went on the deadly Manacles. Near her were the masts of the sunken

Mohegan, just peeping above the water. The night was calm and the sea smooth, therefore there was no great difficulty in placing all her people ashore in the boats. Subsequently she was refloated, reconditioned and as the *Philadelphia* she ran for nearly a quarter of a century in the express service of the American Line, finally being burned out within quite recent years when under the Italian flag.

The greatest disaster upon the sea was the loss of the *Titanic* in 1912. She was then our newest, biggest, and finest ship—yet when she struck a submerged iceberg the shock was so slight that many on board did not notice it. Other liners had run full tilt upon an iceberg, and had then limped home with crumpled stems, often resembling a concertina, to tell the story; the damaged portion was cut off, a new one built, and these ships went on with their work. Not so the beautiful *Titanic*—her first voyage was to be her last one. She was half way across the Atlantic when the lookout saw something ahead which he at once decided must be a berg, the course was altered immediately, but as roughly seven-eighths of a berg is usually under water, the poor liner received a glancing blow from a submerged portion of the ice. Few, when they knew the cause of the stopping of the big ship, guessed that any real damage had been done. But when the boats began to leave her, and she dipped at the stem, the dreadful truth that the world's finest liner was sinking was fully realised. Alas, there were not sufficient boats to go round, and those which had been got away were not all full. They were told to get as far from the ship as possible; they did, and after two hours waiting for a rescuing

vessel the occupants of those boats saw the *Titanic* stand upon end, her lights went out for a moment, then came on again in all their brilliancy, then again all was dark. The *Titanic* sank with a rumble like a train through a tunnel as her machinery broke loose in her inverted position and rushed to the stem. Over 1,500 persons were lost in this greatest wreck; those saved were picked up about an hour after the giant liner had sunk by the Cunarder *Carpathia*.

CHAPTER XX

UNLUCKY SHIPS

WHILST some steamships live out their lives without much excitement, going regularly to and fro on their voyages, there are others which seem to have been born unlucky. One of the most unlucky ships was the *Great Eastern*. Brunel, her designer, was a man with great ideas, usually much in advance of the period in which he lived. He had built two very successful steamers in the *Great Western* and the *Great Britain*, and he had also planned and built the broad gauge Great Western railway. When this was done he wanted to design the biggest and finest steamship which had ever been seen. So, with the help of Scott Russell, he planned the *Great Eastern*, first named *Leviathan*.

The *Great Eastern* was roughly six times the size of any ship then in service, and not until the last years of the old century was she surpassed in general dimensions.

Before she was ready for sea, trouble began for the huge liner. In launching her a miscalculation was made, and the big hull stuck between land and water. It took many weeks of patient effort and costly work to get her afloat.

On her trials a boiler went wrong, and in the explosion which followed, several men were killed,

or severely injured. The *Great Eastern* was tried on the "Atlantic Ferry," but she could not earn her expenses. Then she was sent out to Australia on trips for which she had been specially designed. Again the same story was told, she always cost more to run than she could earn. Her machinery was complicated, consisting of paddle-wheels and a screw, also she had five thin funnels and several masts.

At last she was placed on a duty to which she was really suited—the laying of a great cable across the Atlantic. Here her great size stood her in good stead, she had plenty of room for the cable, for her coal, and provisions. After another cable laying expedition she became a white elephant amongst ships, and was used sometimes as a show vessel, as being the largest ever built; at others she was used as an advertisement hoarding, her sides plastered with posters. Many firms bought her and sold her at a loss, until finally, the ship breaker secured the poor giantess and made a good thing from her metal. This was in the 'nineties of the last century, and no sooner had the *Great Eastern* gone than the new White Star liner *Oceanic* took her place as being slightly larger.

Large though the *Great Eastern* was she had a tonnage of only about a third of the present *Majestic*, and rather less than the average Atlantic liner of to-day.

Like many other innovations the *Great Eastern* was a little before her time. Had she come in the 'seventies, instead of twenty years before, her fate would have been vastly different. In the 'seventies the compound engine was introduced, and these made many an unprofitable ship into a successful

one. It was then thought too late to re-engine the *Great Eastern*, and so she burned her coal without getting the full benefit that the compound engines would have given.

Another unlucky ship, in her early days, was a German-built liner the *Kaiser Fredreich*, which did not reach the speed stipulated in the contract. The shipping company refused to take the ship, and for fifteen years she swung lazily at a buoy in a German harbour. She was gradually rusting away when a French firm bought her at a bargain price, and when re-fitted she did splendid service for her new owners.

The Inman Line in England had a similar experience with the beautiful three-funnelled *City of Rome*, which could not maintain the speed contracted for. The Anchor Line bought the rejected liner and she became their favourite ship. What had been thought too slow for the Inman was quite fast enough for her new owners.

The two ships just mentioned were unlucky at the start, but they did not remain so.

Another Inman Liner was also unlucky on three occasions, though she remained right throughout her life one of the favourite ships on the Atlantic. This was the last *City of Paris* to fly the Inman flag. She was built in 1889, and as soon as she was placed in service she secured the "Blue Ribbon" of the Atlantic by her remarkable speed. With her sister, the *City of New York* she was the most beautiful liner afloat. In addition, these liners were amongst the first to have twin screws instead of the single propeller.

It was claimed that with twin screws sails could be abolished, since, if a propeller broke off, or was disabled by wreckage, the ship could still get along

quite comfortably with one screw working. The *City of Paris* was unlucky enough to have one of her propellers break away, and the shaft broke through the watertight compartment and wrecked the other engine. With both engine rooms flooded from the hole made by the broken shaft, the *City of Paris* was quite helpless!

Fortunately, although there was then no wireless, she was near the Irish coast, and very soon help was forthcoming.

Again the *City of Paris* was unlucky, she drove on to the deadly Manacles, a series of sharp rocks off the Cornish coast in a fog.

It really seemed that the cruel rocks pierced the hull and she was held fast. By dint of hard work by the salvage people she was got off, after it had been several times reported that she would never float again.

But the salvors stuck to their job, and she was at last patched up and sent round to Messrs. Harland and Wolff at Belfast to be rebuilt. When she came out again she had lost one of her three funnels and her name changed to the *Philadelphia*. It seemed that her ill luck changed with her name.

She served through two wars, and was then sold to an Italian shipping company. Then her ill luck came back once more; she was destroyed by fire and all that remains of her is the wreck of her graceful hull, burnt out to the water edge. This used to be seen on a deserted part of the Mediterranean coast.

Another steamer which had an unlucky adventure, but which came through it all right at the end, was the cargo vessel *Ferret*. She was chartered by some men who wanted to make money dishonestly, and set sail for the Mediterranean, whence she was

reported lost without any of the crew having been picked up. Her boats and lifebelts and several other things which would float, were picked up near Gibraltar, which place she had been seen to pass a few days before the wreckage was found. What really happened was that her captain had run back in the night with lights out, and so to the Atlantic. The wreckage had been purposely thrown overboard. A claim was made on the insurance people, and was paid. Meanwhile the *Ferret*, with her name changed and her funnel repainted, was speeding across the Atlantic. At a port in South America she got a large cargo of coffee for Marseilles; instead of sailing for the French port, she made for Cape Town and there unloaded her cargo.

The coffee was sold and a cargo of coal was taken on board and again the *Ferret* sailed, but again under another name. For some time the rascals in charge of the ship went from port to port, and had they not tried to sell the stolen craft, it is possible they would have got away with their ill-gotten gains. But when they were so anxious to sell the ship, the Customs people became suspicious, the *Ferret* was visited, her disguise discovered, and the captain and crew were arrested. It was found that the main body of the crew had no part in the fraud, and they were released, having been heavily punished by losing all their wages.

There may have been a few other cases like the *Ferret*, but the business of running away with a ship can never be really profitable in these days of steam and cables. It is a mild form of piracy, and the risks taken are seldom worth the returns. It is more usual to find crooks heavily insuring an old ship and then contriving her loss at sea. But here



The "Great Eastern"

The sea's most historic failure, which might very easily have been a success had she been used for the service for which she was designed—long distance trades.



“Charlotte Dundas”

The first practical British steamboat, built in 1802, but killed by prejudice.

again the shipping regulations are all against successful enterprises of this description. It cannot be carried on successfully for long.

The *Great Britain* was the first iron steamer to be built, and for years she was the only big ship to be equipped with a screw propeller instead of the usual paddle-wheels. This famous vessel was designed by Brunel and was built at Bristol. Right from her cradle she was a ship with history written large upon her.

As if not enough to have been the first iron vessel and the pioneer screw-driven liner, it was found that she could not be launched. Like the man who built a handcart in an attic, the builders had constructed the *Great Britain* in a dock which was not deep enough for her big hull, equipped as it was with heavy machinery, to pass over the sill. Usually a vessel is built upon a slip, and is launched before the engines and boilers are placed aboard; the *Great Britain* was actually built in a dry dock. When the water was admitted to float her out, she would not lift until the entrance had been deepened.

The *Great Britain* encountered a severe storm on her maiden trip to the Thames, and the waves lifted the hull so often that the screw propeller was often whirling in mid-air, giving the vessel a frightful jar whenever the screw left the sea and something of a shock when it met it again. Three of her starboard ports were stove in, together with their iron frames, her angle irons were bent and much of her ironwork split. She was lucky to have come through such a storm, but the gallant ship struggled on and reached the Thames in safety, and in what was then record time.

Afterwards she went on the Liverpool—New York service and traded regularly for some time. Then, upon one voyage, she somehow missed her course and went ashore in Dundrum Bay through an error in a chart.

For eleven months the big vessel was ashore in the bay, then she was refloated and taken to Liverpool for repairs. Here it was found that she was very little the worse for her mishap; this having been stated our shipbuilders turned at once to the construction of iron ships—thus the *Great Britain* helped in the making of steamship history. For a great number of years she ran between this country and Australia; then came another storm which battered her old body so much that, having reached the Falkland Islands, she was sold to become a coal hulk; in all probability the *Great Britain* is still there after her wonderful fights against wreck and storm.

By the same builder and from the same yard came the *Royal Charter*. She was also a full-rigged ship and was considerably faster under canvas than under steam. But unlike the *Great Britain* her career was a very short one. After three years' voyaging she was totally wrecked by going ashore on the Anglesea coast in October, 1859. She had been fighting a gale all the way up the channel. The wind and the strong currents drove her ashore in the night when almost within sight of her home port. Out of 500 persons aboard less than 40 were saved, and these only by the intrepidity of a seaman who swam ashore with a rope round his body.

This was one of the worst disasters of the Victorian era and, in proportion to the number of people

carried, was really worse than even the loss of the *Titanic*.

The *Sarah Sands* was a Liverpool built ship of the same period as the *Great Britain*, and she was also constructed of iron. The *Sarah Sands* was screw-driven, and made quite a number of voyages as a first class liner between Liverpool and New York. Then came a gold rush to Australia, so she was sent thither, crowded with men keen on making their fortunes. Later she went into the Canadian trade; during her service on this route she went ashore and remained upon the rocks in the Straits of Belleisle for four days and nights. How splendidly she was built may be judged when on docking at Liverpool it was found that she had not strained so much as a single rivet. Ill fortune still dogged the *Sarah Sands* for no sooner was she out of the graving dock than she capsized, owing to her ballast having been moved and not replaced, but again she delighted her owners by escaping without injury.

Her next misfortune came through fire, and this ended her career as a steamer, but not as a ship, since she was converted to a sail. Fate still pursued her and, in 1858, after a brief twelve years of a very varied life, she went ashore near Bombay where the rocks proved too much for even such a well-built ship as this vessel with the somewhat prosaic, if uncommon name.

The name of the Guion Line has disappeared from the list of Atlantic steamship companies, but fifty years ago it was almost as well known as the Cunard and White Star, with whom it fought strenuously for the speed record of the Atlantic. Several times it held for short periods the Blue Riband, and possessed, in its hey-day, many ships of splendid

design and power. Two of its fleet were built for record breaking; these were the *Dakota* and *Montana*, and both shared a common fate in going ashore, strangely enough within three years, and within a mile or two of each other. This was on the Welsh coast, which seems to have been the graveyard of many a noble ship of the nineteenth century, possibly because it was not so well supplied with lighthouses as now. An earlier Guion liner, the *Chicago*, went badly ashore in Cork Harbour during a bad fog, and within an hour every soul had been landed in her boats. Another fine liner of the later half of the nineteenth century was the *City of Chicago*, owned by the Inman Line, she met her end after a successful career on the Irish Coast, which shared with the Welsh an unenviable reputation as one of the deathtraps of Atlantic steamships.

CHAPTER XXI

SALVING TREASURE SHIPS

It has been well said that the ocean bed is strewn with riches, and the greatest of these are the lost treasure ships, which from the very earliest days of ocean travel, have been adding to Father Neptune's golden treasury.

There have always been stories of the vast treasure lost when the Spanish Armada paid its fruitless visit to these waters. For such a large fleet the treasure chests had to be deep and long. And as the sea was no respecter of ships, those with the treasure aboard shared the fate of so many of the rest of that brilliant company. Several were lost off the Scottish and Irish coasts in their vain endeavour to return to Spain by the northernly route.

There is a story of one of these ships which reads like fiction, but it is nevertheless true. In an Irish village the tradition was handed down from those who saw her sink, just beyond the bar.

Through all the centuries which have gone by since the dispersal of the Armada the story persisted that a galleon had lain outside the bar of the small harbour, waiting for someone to come along, raise her, and reward the villagers who had kept the tradition.

It so happened that a diver had been sent to do some work in the vicinity; one day whilst enjoying

a pipe he was told the story of the wrecked galleon. Most men would have dismissed the story as of very dubious veracity. But not so this man; he felt that there might be some truth in it, and he resolved to put the story to the acid test of under sea investigation. The diver had first to complete his contract, then when this was done he still stayed on at the village. The fisherman who had told him the yarn took him out daily in his boat to find the wreck. Each day they returned with their boat and the grapnel without any success.

"The old fisherman is happy now that he has got someone to believe his tale, but what a very foolish person this diver man must be."

That was the burden of the talk in the village now. Still the two men went on with their search and after many weary days the diver felt his grapnel catch something; it held firm, and he felt certain that it was the much sought galleon. They set a buoy to mark where the grapnel held to what they believed to be the wreck. Then with his diving apparatus at hand, the diver slipped into his suit and went down the shot line. He almost dropped upon the rotten deck of the Spanish galleon; much of her had gone, but sufficient remained to give him a good idea of what she had been like when more than 300 years before she had sailed on her last voyage. Then came a long and very patient examination of the wreck to see if the other part of the story held good, that she held many barrels of treasure.

For a long time the diver groped in vain to find any semblance of the barrels—small heavy things—in which the Spaniards were reputed to have stowed their doubloons. He found no barrels for the simple reason that even their stout oaken staves had



"Victory"

Margate Excursion steamer put on service in 1818.

crumbled away, but he did find the doubloons which they had contained. And the story that the coin had been packed in the barrels was proved correct, because these Spanish doubloons actually kept the form of the barrel into which they had been placed. The diver and fisherman shared their rich treasure, though it did not reach the fabulous sum of popular repute. The diver built a row of houses with his share, calling it Dollar Row.

Another galleon from this great fleet is reputed to have gone down with a treasure estimated at a couple of million pounds. The scene of this wreck is in Tobermory Bay, and though many expeditions have worked hard to explore the sea-bed only a few remains have been discovered. Quite easily these may be from a lost English ship, though experts are divided on the subject. The story of the loss of this big galleon persists in the district, and to it has been added a spice of romance in the legend that it was a Highlander who sent the big ship to the bottom. The legend goes that a foray party from the galleon captured a Highland Chief, and they decided to keep him aboard until such time as they were clear of a coast which had been singularly inhospitable, the inhabitants of which refused to supply the Spaniards with provisions or water.

The chief was so incensed at his forcible detention aboard the galleon that he decided upon a terrible revenge. It mattered little to him that the revenge meant the sacrifice of his own life; in any case he might never be set free—he had heard all about the Inquisition and other courts in Spain which tried men on trumped up charges, and then gave them either to the flames or the galleys. The Highlander got into the magazine of the galleon and set fire

to it. The big ship blew up, with a fearful explosion, and the whole of her company, some 500 souls, went to their doom with the Highland chief. As with the story of the galleon off the Irish coast which proved such a gold mine to the diver and the fisherman, so it may have been in this case; tradition may have preserved the true story. If so the fact that there is so little of the big ship to be found lends colour to the legend of her blowing up. Then again the set of the tide may have covered deeply the bed of the bay with sand. So long as there is anything found in Tobermory Bay so long will the search for hidden treasure be prosecuted. It is a wonderful game of chance, and such a game always appeals to the sense of romance in a man.

An English ship, the *Lutine*, was wrecked off the Dutch coast in the last year of the eighteenth century. She was a frigate of thirty-two guns, and her particular mission when she was lost was the conveyance of something like one million pounds of bullion and coin for the pay of our soldiers then fighting on the Continent and also for the relief of German merchants whom the war had placed in a serious financial position. These were days when Britain was looked upon not only as the only barrier against the world-wide domination of Napoleon, but also as the banker for many nations in Europe.

The *Lutine* ran into a fierce gale after setting sail from Yarmouth, and, despite all that could be done for her, she was carried right off her course and sent aground on the sandy shoals off Holland.

Out of her whole company but one man escaped to tell of her going, and so quickly did the sand engulf her that in a short time there was no trace of the gallant frigate left.

The *Lutine* was heavily insured, so the famous association known as Lloyds had to pay very heavily the amount being roughly nine-tenths of the value of the treasure aboard. When the under-writers pay for the loss of a ship and cargo they are at liberty to make what they can of the wreck and what it holds. With such a large amount at stake Lloyds determined to try for the bullion of the *Lutine*. Had the work of salvage been undertaken at once there was a good chance of the major portion of the treasure being recovered, but the war prohibited immediate work upon the *Lutine*. Salvage was at last possible with the general peace. Then an unforeseen difficulty was encountered by Lloyds; it was simply that the Dutch Government claimed the whole of the wreck, and it was a claim hard to dispute on the grounds of International Law. Whilst the right and wrong of it was debated between Governments, the fishermen of the coast found that angling for bullion was more to their taste and profit; indeed, their Government encouraged them to get as much of the *Lutine's* treasure as possible, offering them a third of all the gains. In this manner it was known that close upon £60,000 worth of bullion was recovered and converted into Dutch currency, the salvors taking the agreed proportion. Possibly the amount greatly exceeded this sum but was not disclosed. In later years salvage became much more difficult, the sand covering up the wreck so completely that many attempts to locate her failed. The Dutch themselves spent as much as they had gained in their continued quest for the *Lutine*. Then, after years of negotiation, our Government persuaded that of Holland to agree that the *Lutine* and all it contained was really the property of the

underwriters. By this time the 'fifties of the last century had been reached; then happened a surprising whim of the sea; what she had covered so carefully she now revealed—the *Lutine* appeared again as mysteriously as she had been swallowed up by that all embracing sand!

Salvage was again attempted, but though the ship had been discovered the state of her treasury did not admit of more than two thirds of the sum salvaged by the Dutch being reached. The sand had penetrated the interior and the weight of it had broken through the stout timbers of the poor old frigate, doubtless much of the treasure sank by its weight to a depth too great to be reached.

Several other attempts were made to get at the *Lutine* during the latter half of the nineteenth century, but rarely did the result compensate the adventurers. Two things of interest rather than of worth were brought to the surface, and became the property of Lloyds.

The first was the rudder, which made into a chair, is now in the home of this great firm; the other was the ship's bell which is clanged to-day whenever the news to be announced is of importance.

Two announcements are of great interest to the people who frequent the Royal Exchange; one is the safe arrival of an overdue ship, the other announces the wreck of a vessel in which Lloyds are interested.

Efforts at salvage were renewed in the opening years of this century, and various plans were tried to get at this elusive treasure.

One was a kind of giant submarine with air chambers and water tanks which could be opened and pumped out to ensure it sinking and rising.

Perhaps a large tube would be an even better description of the quaint contrivance which was sent out from England for what was hoped would prove the most successful venture of the whole series.

The new salvage instrument failed where others had failed, and for the same reason—that tremendous belt of shifting sand proved too much for the salvors and their equipment.

Just before the Great War brought the salvage men so much work in other and unlooked-for directions, a further gallant effort was made to get at the *Lutine's* treasure chest. The expedition started out fully prepared for a battle with the treacherous sand, taking with them some sand pumps of an improved design. All trace of the wreck had vanished since the last efforts had been made; worse still a familiar mark which had guided all other treasure seekers had succumbed to a storm of unusual violence. Captain Gardiner was in charge of the expedition, and he was prepared for all the difficulties which had been met and never thoroughly mastered by his predecessors.

Finding no trace of the wreck he conceived the original plan of digging a canal right across the stretch of sands under which the *Lutine* was hiding, using the powerful sand pumps for the purpose.

To old salvage men who knew nothing of the wonderful properties of this new aid to treasure seeking the idea seemed ridiculous. With those currents and the shifting sands it seemed only too probable that long before the *Lutine* was found the sand would have filled up the trench, making it impossible to say where the start had been made. It was very necessary to know exactly where the canal

began so that if the first attempt missed the hidden ship a second could be made from a definite jumping-off place.

These pumps could each move 1,000 tons of sand an hour. With such appliances as these the work of cutting a deep channel was not too great a problem, and, after quite a short effort, all things considered, the *Lutine* was discovered resting very comfortably under nearly forty feet of sand. To imagine what forty feet means think of the usual four-storey house; the pumps had got down that distance in sand alone, and there was water over the sand, of course. The salvors knew that a single night of storm would undo all their work because the sea played strange pranks even when weather conditions were good.

There was a perpetual game of "beggar my neighbour" going on between the sea bed and the mighty ocean over it. A valley one day was a hill the next, and when to the full force of the currents came the power of the storm, then the problem was one which might have daunted any salvage chief. But here great ingenuity was brought to bear, and the sea was made to do certain work on behalf of the salvors.

As the sand was drawn up the pumps it was accumulated on board the salvage craft, and then taken out and dumped in such a fashion that the currents were deflected. In addition, the sand as drawn up by the pumps was passed through a kind of colander in order that any trace of gold might give an indication of how far or how near the pumps might be to the treasure, which it was now known for certain was distributed in the sand. As a matter of fact quite a number of coins were rescued from the apparatus. At length the divers were able to

penetrate the now exposed wreck, and they made a most curious discovery: it was that the magazine had collapsed upon the spot where the bulk of the treasure was known to have been stored. Worse still, hundreds of iron cannon balls had become a solid mass by the action of the sea. As they rusted they became mixed with the salt of the sea and became inseparable by any ordinary methods. The only thing possible was to use dynamite, or some other explosive, upon this unexpected barrier. But when the first layer had been blasted away, another presented itself, and before this could be tackled the gales, which always accompany the onset of autumn, intervened and stopped all work for that year. When at last a fresh start could be made the whole of the business had to begin right over again, and the gallant salvors, having spent all their available cash, decided, very regretfully, to come home and leave someone else, with a much deeper pocket, to tackle that elusive treasure.

A very similar feat was accomplished by Lambert, that great British diver who forced his way into the flooded Severn Tunnel and closed a sluice at the risk of his life, when he penetrated the strong room of the sunken *Alphonso* in the waters round the Grand Canary.

Here again was a ship in such deep water that most divers would have refused service. So great was the pressure that Lambert despaired of working in the ordinary way, and as he had to penetrate two decks and then the strong room, he decided to use explosives for the heavy work. Slow, laborious work this, putting a tremendous strain upon a diver. So much care must be taken in laying the charge, or quite easily the damage done might obliterate the

whole of the guiding features of the ship. However, Lambert cut through the two decks, reached the strong room, and with a crowbar which he carried down, he prised open the door of the treasure cabin and started sending up the heavy boxes of coin. The first one paid all the costs of the expedition, and left a handsome margin, indeed, it equalled the total recovered from another treasure ship dealt with about the same period.

There was known to be something like £90,000 of treasure in that strong room; Lambert raised £70,000 of it. He received a twentieth part of it, plus all his expenses and salary, so he did very well, but the reward was not greater than the risk.

During the war, and especially during the latter part of it, the British Government had to send large quantities of gold to America to pay for munitions. On a January day of 1917 the White Star Liner *Laurentic*, a famous vessel on the pre-war Canadian services, was despatched with a strong room full of gold and silver, worth something like £5,000,000, easily one of the most valuable cargoes which any ship has carried.

The *Laurentic* was serving as an armed liner, and had already done good service when she set out on what was destined to be her last voyage. Hardly had she cleared the Irish coast than a submarine got her, and she went down so quickly that three parts of her crew were drowned out of hand. The ship was hopelessly lost, but it was felt that even at 120 feet the treasure might be recovered, despite the exposed position in which the ship had settled down. Some of the more cautious people suggested that no salvage work should be undertaken until the end

of the war. But it was pointed out that the experience gained with the *Lutine* showed that it might be now or never, and special salvage craft were told off to do what they could. At their head was Commander Damant, who was reputed to know more about diving than any man under the white ensign. One thing was not overlooked—the German submarines. It was felt that they, whether they knew the secret of the *Laurentic's* strong room or not, would be on the look out for any salvage craft. One salvage steamer in Davy Jones' locker was worth three ordinary vessels because the plucky little fellows had brought up or rescued many a ship which had been placed out of action by the U boats.

The work began and all went well until the destroyer which had been told off for watching purposes was called away; then a submarine bobbed up and prepared to torpedo the salvage craft.

She had to run for it, so after this experience, and it being evident that ships were needed now more than gold, salvage operations upon the White Star boat ceased until the cessation of hostilities. The strong currents and heavy storms of the Atlantic had done their worst with the proud *Laurentic*, once the premier ship on the Canadian service. She was flattening out rapidly, and what the sea did not accomplish by sheer pressure, it was bringing about by red rust. The first season saw a tenth of the treasure lifted; it ought to have been more, but the divers were working under the greatest difficulties, and days together the gales, even in summer, laid them off their work. The next season saw renewed efforts, made under still greater difficulties, since the wreck had collapsed still further and blasting had now to be resorted to.

Then came a succession of weeks of bad weather; the trying summers experienced on land, when the weather played strange pranks during the holiday season, had their reflex in that lonely Atlantic salvage effort. Several seasons passed without the work paying expenses, and then came a couple of good summers which allowed all but £250,000 of the treasure to be recovered.



“Clermont”

Robert Fulton's famous pioneer steamboat on the Hudson River.



"Comet"

The first European passenger steamer which was built on the Clyde in 1812

CHAPTER XXII

THE DIVER AND SALVAGE WORK.

DIVERS cannot work at very great depths with the usual dress. Only very exceptional divers can work at depths of 150 feet, though a new German diving suit has been proved quite safe at 300 feet, and even greater depths may be attempted where the conditions are favourable.

Over and over again the diver has had to give up his task, beaten by just a few feet of water. The pressure is too great, and the men become seriously ill if they attempt too great a depth.

Often they have had to take a long time in slow descent, work an hour, or even considerably less, and then come up as gradually, with the result that the day has gone and little has been accomplished.

The thought must have often come, "What happens to a ship lying at a great depth? Is it possible to reach and get up anything worth salvaging from such great vessels as the *Titanic* or *Lusitania*. Seeing that each of these ships were worth more than a million pounds, and that there was valuable cargo, and perhaps bullion in the case of the latter ship, why is an effort not made to secure it?" The answer to such a question as this was found in a wrecked ship off the Australian coast. The great pressure of water above smashed in her decks, and

the divers were able to calculate roughly how long it would take for the ocean to flatten her right out. This estimate was based upon the state in which she was when first discovered compared with that, when, months later, they had their new apparatus from home, and were able to stand upon the battered wreck.

The *Titanic* lies too deep for any thought of diving, even with the new German apparatus with which such extraordinary results have already been obtained. And if she could have been reached within a few weeks of her sinking, it is safe to assume that an unshapely mass of steel would have represented the finest ship of her day.

Nor would the case be much better with the *Lusitania*, though she lies in comparatively shallow water, certainly within reach of the German diving suit. But again, after several years, there would be little left of the *Lusitania* worth retrieving, and there is no mystery to clear up as regards her foundering.

A wreck off the Australian coast was the subject of a fine salvage feat some thirty years ago. The *Catterhurn* had sunk with specie worth £10,000.

When the divers set out upon their task of reaching the tank under the chart room where the specie had been deposited, they were told that the ship was down 140 feet. When they got down as far as their shot line would reach they were still more than thirty feet above the wreck, which they could see like a phantom vessel right beneath them. Many experts regarded further effort as useless, 180 feet being out of the question for safe working according to their calculations. But these brave fellows had made up their minds that the treasure should be theirs, knowing that the underwriters would be

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prepared to allow them a good percentage of their gains. They sent to England for improved diving apparatus, and when it arrived they tried again, this time successfully, though they were often very exhausted when they came up.

The men at length found the chart room and the tank under its floor which contained the treasure, which was in coin, not in bars as is usually the case. The coin was packed in wooden boxes, upon which the sea had also begun to do its worst.

Even when the divers had secured the boxes and slung them on to the lifting rope they felt by no means sure that they would reach the surface. Should a box burst it would be like looking for a needle in a haystack to find the coins.

One day as the divers were at work something dark passed close to one of them, coming back in a moment and actually touched him. It was a shark which had taken up his quarters in one of the cabins—or what remained of a cabin. The shark went to and fro about his business, and the divers went about theirs, but it was not exactly a comfortable feeling to have this deep sea monster at one's elbow.

There were other fish, and for these the bare hands of the divers proved an alluring bait. Not once, but often, the divers felt a nibble at their fingers and had to hit out with their other hand. Fortunately, these were not sharks, or the hand would have gone before any shooing away could have been attempted.

Sharks rarely interfere with divers, but there is the deadly octopus. The shark is rather inquisitive where the diver is concerned, the octopus is exceedingly so. Both may be frightened away by the

diver opening an air valve and sending out, quite suddenly, a string of bubbles. But the octopus is insidious in its approach, and should the diver be intent upon his work, the horrible tentacles will have enclosed him before he will have been aware of the presence of the grisly thing. He must signal hurriedly to be drawn up; on several occasions a diver has been pulled on to the deck with the octopus. Then the axes of the boatmen have had to cut away those slimy tentacles, sometimes killing the horrible thing, but more often he has escaped with the loss of one or two of his feelers.

The divers in the case of the *Catterhurn* were able to raise roughly £8,000, receiving 15 per cent. of the amount as their reward. They had to leave several thousands in the ship, but their employers felt that there was too great a risk working at such a great depth and that the lives of their men were worth more than the bullion.

There is a story told of two divers who quarrelled and fought on the sea bed. The *Royal George*, a fine war-ship of the latter half of the eighteenth century, was careened at Spithead in order that her hull might receive attention. Through gross neglect the ports were left open, and it followed that as the ship dipped over, through her cannon, etc., being run to that side, the water flowed in and she sank, taking with her a great number of people.

Years after, divers were sent down to explore the wreck, and to recover her guns. Two divers each claimed a certain gun as his trophy: both lost their tempers, and round the rotting timbers of that old warship was set the stage for a possible tragedy. At length one man decided to go up the ladder, having had enough of the struggle. The

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other pursued him, and tried to drag him down. In the struggle the pipe of the attacked was severed, and had the people above not pulled him up at once, he must have been drowned. Afterwards the men made up the quarrel, and became the greatest of friends.

The Great War taught us one very great lesson; it was that without our ships we were doomed. The Germans knew it, hence their intensive submarine campaign, which came so near complete success. Although hundreds of valuable ships were sent to the bottom, and the great majority of them became total losses, the salvage corps restored many what appeared hopeless wrecks to service again. To such a fine art was ship salving brought that standard patches were made and kept in readiness for torpedoed vessels; often these patches were taken out and fitted at sea, the ship then coming home under her own steam. Not often could such a course be pursued because of the activity of the German U-boats. More often the sinking ship was beached, and the operation carried out there, more often still she was temporarily repaired and then brought round to a ship hospital. Some of the torpedoed ships seemed to bear a charmed life. One at least was torpedoed three times, and yet lived to see the end of the war. Others succumbed to the third torpedoing, whilst dozens braved the first and went down at the second attempt.

One case comes readily to mind where a ship was caught by a submarine, run ashore, patched and got to sea again. No sooner had she started afresh than another torpedo got her, again the operation of patching and refloating was undertaken, and for a third time she was torpedoed. Yet despite

all this the ship of many lives got safely to her port, though she resembled a certain hero in the nursery rhyme "all tattered and torn."

What is the greatest feat of salvage on record? Probably the honour should go to the Italians in their fine performance in getting up the finest battleship of their navy after she had been wrecked by an internal explosion such as sent our *Bulwark* and other units to the bottom when safely moored in harbour.

The *Leonardo da Vinci* was in Taranto Harbour on a summer's night of 1916 when a fearful explosion took place, rousing the town and the men on all the other naval units there assembled. No one knew exactly what had happened, but something terrible it must be. It was; the sweep of searchlights showed the great battleship in flames, with a huge pall of smoke above her. And as the people watched they saw her take a tremendous dive, turning right over as she went. Hundreds of the gallant crew went with her. The *Leonardo da Vinci* had met the fate which we suspect several of our ships met in those trying days: somehow or other a time bomb had been introduced into the magazine, and with deadly effect.

Could this fine ship, which cost about four millions of our money be saved? Nine out of ten salvage experts said no; the tenth said "yes." The Italians had a soldier who had passed from fighting to naval construction. This was General Ferrati, and he was certain that if his plan were adopted the battleship could be salvaged. But the method of salvage was one which made many experts wince; the problem was to be tackled in a new way, and new ways are not always welcome, even in the salvage world,



White Star "Olympic" at sea

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which should be ever on the alert for fresh methods. Ferrati's plan was to raise the battleship from the bottom, and without attempting to turn her over, carry her into dry dock; there certain work would be done, she would be towed out again, and righted in the fairway, then would come the work of restoration of a ship that on all counts ought to have been written off as so much scrap. She would have been but for one thing; the enemy boasted that they had destroyed the finest unit of the Italian fleet. "We will prove that you have done nothing of the sort!" came the reply.

First came the preliminary investigation by the divers. They found, as all suspected who had seen her position, that she was resting on a mudbank, and that the weight, something like 24,000 tons of that huge hull was exerting such pressure on the sea bottom that she was going deeper, foot by foot into the mud. One expert said that she had already sunk thirty feet in the mud, but that seems hardly feasible, especially in the light of subsequent events.

Ferrati had been much impressed by the lifting power of the envelopes of Zeppelins and other airships; these depended, of course upon gas which was lighter than air. It was impossible to fill the battleship with such gas, but it did seem possible to lift her by something which would operate in the same manner—compressed air. This was not the first time that compressed air had been used for lifting a sunken ship, but never had anyone proposed to lift such a huge mass as this 24,000 ton battleship with a huge rent in her from keel to top deck.

The next step seemed hardly worth while; models of the *Leonardo da Vinci* were constructed, complete in almost every detail, and experiments were made

with them to determine how they would behave in varied circumstances. Much valuable information was gained from these miniature experiments.

The most remarkable feature of the whole salvage feat was that it was tackled during the war. For one thing the battleship took down with her a great quantity of ammunition. There was a possibility that this had been exploded in the disaster, but experts thought not, otherwise there would be less of the ship left to view (her keel was exposed). Again the ammunition would be spoiled in all probability. Still the divers were sent down to bring some shells up. Thousands of shells were brought up, and they were found to be in perfect condition, and were used subsequently against the Austrians.

Next came the patching of rents in the hull. Power was obtained from a land station for operating the necessary machinery, a cable being led to the ship quite a mile long, possibly more. Once the keel was made airtight again, compressed air could be pumped in. As it could not escape, it pressed the water down to such an extent that men were able to enter the ship, via an air lock, such as is used on our underground railways during their boring, and remove further stores and fuel. Then another problem was faced, a serious one this—and it was overcome. It was necessary to get the *Leonardo da Vinci* into dry dock upside down, but there was no dry dock near Taranto which was sufficiently deep for this. In point of fact the battleship in her reversed position drew many more feet than when on an even keel; this because of her funnels, turrets and mast. All these were deep bedded in mud. It was resolved to remove them, and this proved the most ticklish job of the whole

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salvage feat. Men had to work inside those turrets and funnels deep down in the mud, and cut them away. By the use of compressed air and the air locks, they did it, but it took them months, and the war was over before the word went round that whenever they wished the engineers could now float the big hull.

Next a channel was specially dredged from ship to dock, then camels—i.e. round air cylinders used in salvage—were sunk along the submerged hull. When these were pumped out they rose and exerted a tremendous lifting force upon the hull. Meanwhile the dry dock had been specially prepared to receive its strange visitor—a ship upside down. The bottom had to be specially prepared. In the ordinary way a series of chocks are found in a dry dock, these take the keel of the vessel, and allow one to pass underneath. In place of a string of chocks, a whole forest of dwarf trees were needed so that the decks of the *Leonardo da Vinci* would not crush inwards and leave the salvors with a worse problem than they already faced.

On a September day in 1919 all was ready for the great experiment of lifting the ship from her mud bed, leaving her turrets and other impediments behind. Would air beat the mud? That was the question on all lips. The salvors knew, because they had already made tests. But it was a stern struggle before air, the ally of the engineers, won its battle against the mud, which held down the *Leonardo da Vinci*. The battleship rose slowly, and, at once the tugs seized on her, and placed her safely in the dry dock. It took some delicate handling to get her exactly into the position required over the miniature forest of struts. At last she was moored

safely, then the water was pumped out, and the next stage could be attempted.

A certain amount of repairs could be undertaken whilst she was upside down; when these were completed the very delicate business of getting her over upon her keel could be undertaken. When all was ready for this final effort of these clever salvors the huge mass was towed out of the dry dock (the latter having been flooded again), and taken to a spot where dredgers had been at work to make a fairly deep basin; it would never do to let the *Leonardo da Vinci* touch bottom again. Hundreds of tons of solid ballast had been placed inside the hull before she left the dock; then when she was in the position chosen for this last and greatest experiment thousands of tons of water ballast were let into certain selected sections on the side on which she was to turn. Water can be, and has been too often, a cruel master to the ship; now it was to prove a servant and a friend. The valves were opened, the water began to pour in and the men who had become quite used to parading the upturned keel left it somewhat hurriedly. Now, if ever, after four years in the wrong position, the keel was to get to its proper place.

With a mighty swing over went that huge body, and for a moment it seemed probable that she would resume her upside down position again. She steadied herself, however, and remained in the position which was needed, albeit she had something of a list as she was taken charge of by the tugs and brought back into the dry dock.

Someone had thought of a touch of sentiment in connection with this turning over of the battleship, someone who possessed the optimistic soul which salvors need. This unknown person, hit on

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the expedient of painting a motto upon the deck of the warship. It was a motto chosen from the writings of the man after whom the battleship was named; it could not have been more appropriate had it been written for this very occasion. In big, white letters painted on the deck, was, "Every wrong rights itself."

Thus ended a tremendous salvage feat which took four and a half years to carry out. Although the salvage of the *Leonardo da Vinci* occurred in a period of prices enhanced by war, the sum expended was not excessive. General Ferrati, who conceived the brilliant plan, did not live to see it brought to fruition, but Major Gianelli, who took charge of the actual operations, must have been a proud man the day the *Leonardo da Vinci* was towed into dock for refitting.

A smart cross channel boat of pre-war days, was the *Onward*. At the time of her loss she was engaged upon trooping duties between Folkestone and France. One night as she lay beside the quay at Folkestone, she burst unaccountably into flames, and was soon blazing away, threatening not only the ship, but the wooden quay. Every quay and every railway line upon them was badly needed in those critical war years, therefore it was the *Onward*, and not the quay which must go. Her sea cocks were opened, she filled and sank, and in sinking rolled over on her side instead of, as was hoped remaining upon an even keel.

The Naval Salvage Section was called in and told that, by hook or crook, they must have the *Onward* away from that much needed landing stage. "I will give you a month, and it must be done well within that time if at all possible," said the responsible

officer to his colleagues in charge of the salvage gear.

The steam locomotive was called in to assist, probably for the first time in history, in the raising of a wreck. Five powerful six-coupled goods engines were pressed into service, and by means of strong wire cables, working at right angles, and other gear, the lifting of the *Onward* was successfully attempted. All her top hamper gear, such as funnels and deck fittings, had been cut away and once she was upright there was no grave difficulty found in pumping her out.

After the war she was brought round to a Thames side shipyard and there the writer was privileged to go over as rusty and battered a specimen of a steamship as it has been his fortune to see. To-day she would have fetched a couple of thousands of pounds for scrap, perhaps even less, but in 1919 ships were scarce, and consequently exceedingly valuable. Not so many months afterwards a picture reached me of a fine steamer leaving dock to take up duty in the channel service. It was the *Onward*, as sound as ever.

The harbour of Boulogne, has two out-jutting piers between which lies the entrance to the harbour proper. During the war a steamer, not a very large one, named the *Araby*, had the misfortune to get adrift, and was swept by the tide right across that narrow entrance, and there held. Previously she had been in trouble, having gone ashore in a storm, her steering gear having broken down. It was whilst being towed to Boulogne for repair that she broke adrift. To-day such a mishap would be awkward and interfere with cross-channel traffic. In those critical days the *Araby* did for Boulogne Harbour

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what our gallant fellows did for Zeebrugge and Ostend—blocked the harbour. The tide was at the full when she went across that narrow harbour mouth, and it was evident that unless she could be got away at once she would be in a very awkward predicament when low water came. Despite all the efforts made and continued for hours, the *Araby* could not be dislodged; she was wedged in between those piers as if she had been built for the very purpose. Her cargo consisted mainly of corn, which make a very heavy cargo, and most of its weight comes in the centre of the hold of the ship. The tide fell and left the *Araby* suspended, bridge fashion, across the channel, the fairway, being, of course, under her centre, the stern and bows being practically high and dry. The expected happened—she broke her back, and as a wreck she blocked the channel very effectually.

During the war we heard a great deal of concrete ships; some of the experience as to how concrete might serve afloat was gained upon the *Araby*. The salvage was shared by the army and navy, each putting their ideas forward, first for moving the obstacle, secondly for moving her without the risk of further damage. In the early years of 1917 the shortage of shipping was already serious, thus the *Araby* was too good to lose, damaged though she was. The plan adopted for her salvage, was to place a concrete bulkhead across each of the damaged halves, this done she could be pumped out in sections, each section then being moved from the fairway. The work was done quickly and well, and what had seemed an obstacle which would only respond to dynamite, involving complete destruction of the ship, was moved further up the harbour.

Eventually by means of pontoons, each half was got right out of the way of traffic, being hauled up fairly high on the shore, and there left until the time came for repairs.

The salvage people were kept too busy to fulfil their original intention of taking the mutilated ship home for repair, and two years dragged by. Few objects were so well known to our 'Tommies on their way to and from the front as that divided ship. All sorts of stories were told of her adventures, and certainly the true version was thickly overlaid with romance. Then, as the war was drawing to a close, it was decided that the space the *Araby* took up was needed for other purposes, so both halves were hauled from their resting place, and, despite the German submarines, they were taken separately across the channel and rebuilt into a whole.

A fine piece of salvage work was affected when the White Star liner *Suevic* ran ashore off the Cornish coast. The *Suevic* belongs to the White Star Australian fleet, and like the rest of the ships turned out from Harland and Wolf's Belfast yard, was of the highest class. The salvors decided that the forepart of the ship must be sacrificed to save the after-portion, which contained the engines. The usual work of amputation took place, dynamite being the rather rough-edged surgeon's knife. So well done was the task that the *Suevic's* boilers were set going afterwards, and as she was towed stern first towards Southampton, her own engines, with the screw in reverse gear, actually assisted the tugs. The new half was built at Belfast, and then towed round the coast to Belfast—no light job this. The operations described elsewhere for the *Milwaukee* were repeated here.

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On the same coast not so very long ago, one of the post-war fleet of the White Star, the *Bardic*, drove ashore in a fog, after considerable trouble she was got off and received hospital treatment at Belfast.

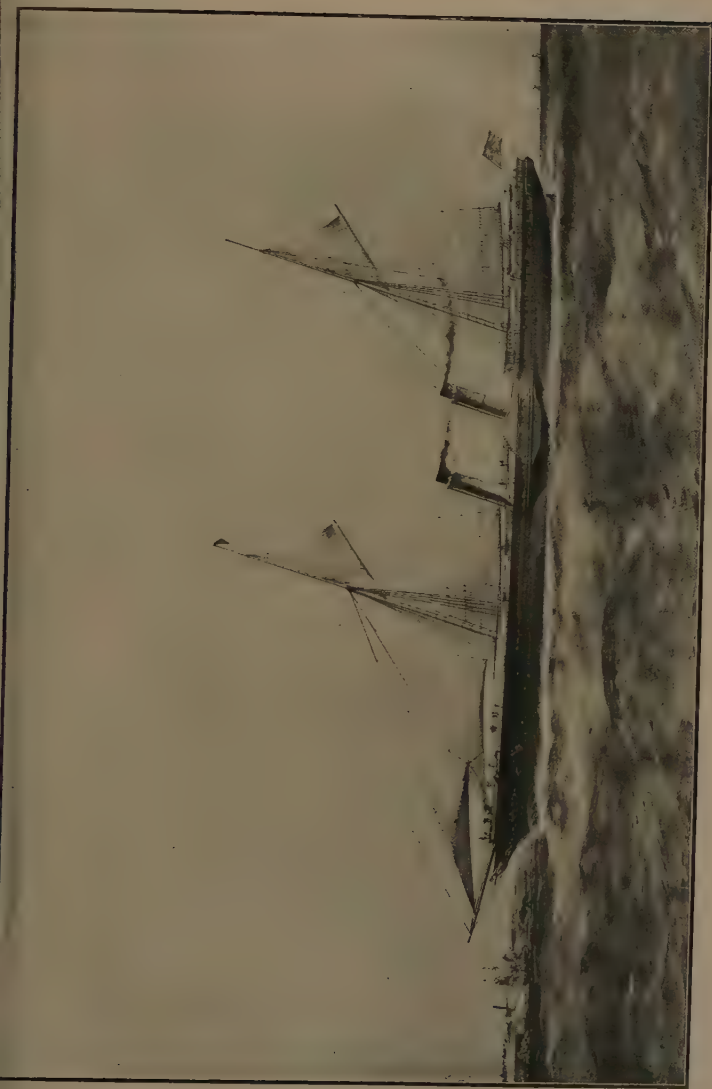
CHAPTER XXIII

SOME MYSTERIES OF THE SEA

THE sea is full of mystery, and right through the ages it has been adding them year by year. Many of them have become fabled, and few have escaped remarkable additions in the telling. From time to time we learn, through the papers, that a certain vessel has disappeared from human ken, and there is some speculation as to what her fate has been. Three theories are usually advanced, first that she has foundered, secondly, that she may have met ice, and so gone under, and, thirdly, that she has broken her back, and so gone quickly to her ocean grave. The first two causes would certainly account for the majority of the disappearances; there would be few attributable to the last mentioned cause, though some cases have occurred in which an escaped sailor or two have told the story of the ship breaking her back in a gale, and then foundering almost immediately.

There was the fabled sea into which a vessel was drawn in an ever narrowing circle until, finally, she was sucked down in a maelstrom.

Some writers have stated that the fabled sea was none other than the Sargossa Sea, and that when that section of weed-strewn ocean was fully explored, many of those mysteries would be cleared up which,



“Delta”

One of the last and one of the finest of the P. & O. paddlers, which had an extraordinary career after she was sold by the company.



H.M.S. " Shark "

The British Destroyer " Shark," sunk at Jutland. The " Shark " made a most gallant attack on the Germans. She was a typical British war destroyer—about 1,070 tons, speed 35 knots, and armed with three 4-inch guns. Her captain, Commander Loftus Jones, after his leg had been shot off, continued directing the crew to the last.



H.M.S. " Cornflower "

single-screw Fleet Sweeping Vessel (Sloop) built under Emergency War Programme. Has hulls at bows to give extra protection against loss when working up mines. Not a handy ship, single screw gives a wide turning circle. Very lively ship, but can face any weather.

from time immemorial, have puzzled all men. The Sargossa Sea has recently been thoroughly explored by an American expedition, and there is nothing to indicate that a single vessel has been lost there.

The greatest sea mystery, and one that is still quite unexplained—is what is now known as “The Mystery of the *Mary Celeste*.”*

Nothing in fiction is quite so remarkable as this happening of a little more than half a century since. One afternoon of a December day, in 1872, the barque *Dei Gratia*, belonging to Nova Scotia, but actually *en route* from New York to Gibraltar, sailed near a strange looking brig. At the time the barque was something like 300 miles from Gibraltar, and well in the route used by all kinds of vessels. The master of the *Dei Gratia* signalled to the stranger and got no reply. He then remembered that, as he was approaching, a German tramp steamer had also signalled the stranger without gaining attention.

This was so unusual an occurrence at sea, where, as a rule, sailing ships are only too glad to give news, and obtain them, that the captain of the barque observed the stranger more closely, shifting his helm a little to come nearer to the brig. As he watched he noticed that the brig appeared to be out of control, often she was yawing, and then the next moment running before the wind. The glasses showed that there was no steersman, nor yet a soul upon her deck. The captain consulted his mate who replied, laconically, “All below—dead drunk.”

The captain of the *Dei Gratia* then gave the stranger what is known as an “urgent hoist,” which

* In the spring of 1929 a new book, “The Great *Mary Celeste* Hoax,” gives a most reasonable explanation of the mystery, i.e. that the whole business of desertion was arranged at New York between the captains of the *Dei Gratia* and *Mary Celeste*.

is a signal calling for an immediate reply. No notice was taken, but now the two ships were within a very short distance of each other, therefore, the captain hailed the stranger, which might have been the fabled *Flying Dutchman* for all he knew. There was no answer from that vacant deck, no head shot up from a companion as had been expected, and now the captain of the *Dei Gratia* decided that the vessel was, to all intents and purposes, a derelict. He ordered a boat to be lowered, and he himself, with one of the mates and a couple of hands pulled to the *Mary Celeste*, whose name and her port of registry, New York, were plainly shown on her stern. The captain and his mate crept cautiously aboard, just a little fearful. Though this was the latter half of the nineteenth century, when piracy and privateers had been banished from these latitudes, where the safety of the sea was proverbial, there might be some sort of a ruse here. Suppose there were piratical fellows below; this might be the very plan they had formed to capture the *Dei Gratia*. The captain went carefully to and fro, startled now and then by his own footsteps. Everything appeared in perfect order, for all the world as if the whole of the watch on deck had simply taken it in their heads to go below for a meal; a strange proceeding, of course, but what other explanation could be thought of at the moment? The deck was carefully examined, and the two seamen went below and searched every nook and cranny of the ship—all without result so far as any member of the crew of the brig was concerned. Nor was there anything to suggest why they were absent. Here was a first-class mystery of the sea! The captain and his mate each suggested a dozen theories, which, when examined

critically, they had to turn down as not feasible. The ship was in perfect trim. Though she was evidently a derelict, there were no signs of a storm which would account for her being left in the belief that she was about to founder. No captain ever takes to his boats in the broad Atlantic until he is tolerably certain that his ship is about to sink beneath him. But the masts and gear of the *Mary Celeste* were as sound as the day she had been built. There was plenty of food and water aboard, and the cargo, consisting of a number of barrels of crude alcohol, was practically untouched, save that one cask appeared to have been broached. For a moment the thought arose that the disappearance of the captain and crew might be connected with this broached cask, but appearances were against such a theory. The fore-castle revealed evident traces of recent occupation; the seamen's chests were there, quite in order.

Razors were lying about, and they were free from rust; underclothes were still hanging upon a line there; in fact, all was in order, no sign of a hurried departure or untoward happenings in the quarters of the crew. Over the dead fire of the galley were pans and saucepans containing a quantity of food, whilst in the cabin an unfinished breakfast was spread. On the cabin table, too, there was a bottle which apparently once contained some cough mixture, probably for the captain's child, and there was a sewing machine with a small garment in it—apparently the captain had had his wife and child aboard. There were books and a harmonium, and from the music and the books the searchers came to the conclusion that the captain was a religious man. In the mate's cabin there was a piece of paper upon which was a half finished sum. At first the

visitors to the derelict felt certain that there had been a mutiny, and that, in all probability, the captain had been overpowered, perhaps murdered with his family and the mates also, and their bodies thrown overboard.

But when they found practically everything intact, jewels and trinkets, and even money untouched, a mutiny did not seem a feasible explanation. Men who had mutinied would never leave anything of value behind. The only item of value which was missing was the ship's chronometer, and this was the only portion of the navigating instruments which had been taken. There were just one or two facts discovered by the captain and mate of the *Dei Gratia*, but these told them little, though they suggested many possibilities. In the cabin a cutlass had been thrown down, and when it was withdrawn from its scabbard it showed unmistakable signs of blood, which had been wiped partially away, and there were blood-stains on the starboard top-gallant rail. There were also certain definite hatchet marks upon either side of the bows above the water-line. It was as if some kind of staging was intended to be placed round the bows, and the indentations had been cut to allow of it being fixed. But what object could have been served by such an erection?

The ship's log was examined; its entries ceased eleven days ago, though there were some entries upon a slate which carried the log a little farther; these doubtless were transcribed periodically into the log. The last entry on the slate showed that the *Mary Celeste* was quite near one of the Azores Isles. That last slate entry would seem to indicate that the ship was left before the noon of the day upon which the details were recorded. Yet it was

obvious to the visiting captain that the ship had not reached her present position after eleven days unaided navigation. The wind had been in such a direction during those days that it would have been impossible for the *Mary Celeste* to reach her present position without a hand on her helm, and a trimming of her canvas; therefore, it seemed fairly clear that she had possessed some sort of a crew for the greater part of the intervening period just mentioned.

A crew was placed aboard the wanderer. She was brought to Gibraltar quite safely and handed over to the proper authority, a claim for salvage being put in by the captain of the *Dei Gratia*, who was subsequently awarded a sum of £1,700, about one-fifth of the value of the brig.

Now for some of the theories which have been advanced to account for the mystery. Let it be said at once that neither the captain, his wife, child, mates or crew of the *Mary Celeste* were ever heard of again—not the slightest trace of them was ever found.

The first theory advanced (by the officer at Gibraltar who surveyed the ship and furnished a report for salvage purposes), was that the crew had broached a cask of the raw alcohol (which was consigned to Italy to fortify native wines), and that they attacked and killed the captain, his family and the first mate, damaged the bows of the ship to make it appear that she had run ashore or been in collision, and that, by some means, they then effected their escape on some other vessel. Rather feasible until one remembers that the marks on the bows were regular, when they should have been roughly done, and also that the men left behind their own

and the captain's belongings. If they had been taken off by the boat from another ship, the men in that boat would want to know where the captain and the rest of her people were, and one would suggest they would have hinted that the sailors should bring their kit. Again would not the officer in charge of the boat give a thought to the salvage of such a staunch little vessel, even as did the captain of the *Dei Gratia*? No, we may dismiss the Gibraltar report and the theory suggested therein. An officer of the American Naval service examined the *Mary Celeste*, and came to the conclusion that for some reason the whole ship's company left the vessel in a panic, probably because they believed her to be no longer seaworthy after being strained in a gale. Also that she may have developed a leak. Then he goes on to suggest that the boat containing the company was lost and all trace went that way. But again there are serious objections to such a theory. Leaks do not repair themselves, nor do pumps work of their own accord to free a ship of water—and the *Mary Celeste* was free. It might be urged that the people were rescued by a boat from another ship which was subsequently lost without trace. But again there is no record of any vessel disappearing which would fit in with such a theory.

Then it has been suggested that a sea serpent somehow got aboard, the crew either leaping overboard or taking to a boat. One authority suggests that a sea monster of the octopus variety attacked the ship and that the marks on the bows were made in the fight with him, the cutlass being the weapon of defence, hence the blood upon it. All jumped into the sea and thus met their end.

Just before the war the *Strand Magazine* published what was claimed by the writer to be the real truth of the matter. The story was written from a mass of data left by an old seaman who confided the narrative, written in a series of rough diaries, to his employer.

According to this narrator, who claimed to have been on the vessel as a sort of extra steward, the *Mary Celeste* experienced very bad weather after leaving New York. The constant succession of gales, coupled with the extra watches, frayed the captain's temper to such an extent that he one day beat his little girl with quite unnecessary violence because she was caught by him attempting to climb upon the bowsprit. Relenting he thought that perhaps the bows of the ship might be converted into a safe playground for the little one. The carpenter therefore rigged up what came to be called "Baby's Quarter Deck"—thus the hatchet marks were accounted for on the bows, the staging having been rigged here.

A day or two after the captain and the mate had a strong argument as to whether it was possible for a man to swim round the ship when fully clothed. The upshot of it was that, to prove it was quite feasible the captain, accompanied by two of his men were lowered into the water to make the attempt. The captain's wife, child and the rest of the crew—about five in number—crowded to the bows and either got upon or leant against the platform. Suddenly one of the two men with the captain (the narrator was the other), gave a terrific yell, apparently a shark had got him; the spectators leaned over the carpenter's handiwork to see what was happening, and the whole of the platform gave

way, sending the full ship's company into the water, where they were either drowned or eaten by sharks, the captain sharing their fate. The only man to escape was the diarist, who managed to swim to a portion of the wooden platform. On this he floated for days, being unable to get back to the ship partly from fear of the sharks, and also from the fact what a wind springing up bore her rapidly away. In due course, more dead than alive, the steward was washed up on the African coast. Here he was found unconscious by natives, who cared for him until he was strong enough to make the journey to a port, whence he got a boat to Marseilles. Here he was ill and underwent a severe operation, almost going under. This story is so circumstantial that we might be disposed to accept it because it so easily explains so much that has baffled all students of the mystery.

Unfortunately, the other details are so much awry that few will accept the ex-steward's versions. He is wrong about the size of the ship, he is wrong about the storms encountered—there is no reference to them in the log—he is wrong about the number of people aboard, and he gives names which are quite contrary to the records of the crew. With Mr. Lockhart, who in his book *Mysteries of the Sea* examines and dissects this and other versions and explanations, we are inclined to say “that the only genuine part of his story is his illness at Marseilles; that as he was recovering from it he read an account of the *Mary Celeste* in some periodical; and that he brooded so deeply over it that, in the end, he believed not only that he had been on board, but that the events . . . had actually taken place.”

Still another version appeared in the *Daily Express*. In this account the *Mary Celeste* had picked up a derelict tramp steamer in mid-Atlantic and on her was found a safe with over £3,000 in it. This was distributed amongst the captain and crew of the brig. Then, there arose the question as to what would happen should this division of spoil be found out. The tramp steamer had already been scuttled, but her boats retained. This gave them an idea; it was that the *Mary Celeste* should be left afloat, with her own boat on its davits, and they should make for Cadiz in those of the tramp steamer. To cover up their connection with the tramp steamer her name was obliterated from the boats, and in place the name of a schooner hailing from London was substituted. They reached Cadiz, after a sail of fifty miles from the abandoned *Mary Celeste* and told a cock and bull story of their vessel, whose name appeared on the boats, having struck a submerged rock and foundered quickly; then they all separated and got away with their booty. This story was told to a naval officer under pledge of secrecy so long as the narrator was alive; when it was known that he was dead, then the story was given print. There are so many obvious flaws in this yarn that we need not stay to consider them. One strong point against it is that there is no local record at Cadiz of the landing of these men at the port.

Another theory—and this must be the last for our record—was that she was suddenly surprised by pirates from the North African coast, and her people taken prisoners in the pirate ship to Africa and there kept until they died, or, alternatively, that for some days the *Mary Celeste* was navigated by the

pirates in company with their own ship, but then perhaps, from reasons of fear, she was suddenly abandoned and possibly her people thrown overboard to cover up all traces of the crime. Against such a supposition we are up against many facts. The marks on the bows might show the attack, but there would surely be signs of greater disorder aboard. If these descendants of the Barbary Rovers, the true pirates of long ago, had remained on board for several days, they would certainly have left some traces of their occupation, and they would not have decamped leaving cash and jewels aboard. Again, it is unlikely that the *Mary Celeste* would be their only victim, and yet again there is no record of piracy on these seas for years before the mystery, nor after.

So mystery we must leave it; clearly no solution mentioned really unravels it.

The *Mary Celeste* was subsequently lost by going ashore in 1885.

In recent years there has been no sea mystery so baffling as the total disappearance of the then new liner *Waratah*. This was a fine vessel with a tonnage running to five figures, built on the Clyde in 1908.

The Blue Anchor Line were her owners, and this company had ordered her to plans drawn up by their own designer. She carried passengers and cargo, and was classed A 1 at Lloyds—which means that she was as good a ship as could be built. The *Waratah* was intended to trade between England and Australia, via the Cape.

Her first voyage was completely successful, though there were rumours that she had been found a little top-heavy without ballast—a thing which could be said about any ship, but it was a factor which was

commented upon when she was reported missing. If this had really been the case, surely her captain would have reported upon it to her owners, at the end of the maiden trip. The owners would have undoubtedly taken up the point with the builders with a view to some alteration.

Her second voyage—and her last—began in April, 1909. She reached Australia safely, and was well on her way back, having called at Durban where she took on additional cargo, making quite 10,000 tons in her hold; sufficient ballast, one would imagine, for a steamer of her size. She was spoken by a ship between Durban and Capetown, and then she disappeared for ever! She had no wireless, therefore there were no calls for assistance had she needed it. The steamer which saw her last ran into a series of heavy gales, but she came through them as part of the day's work. After the gales came a hurricane, which was described as being the worst that had occurred for some years; it was doubtless during this hurricane that the good ship vanished completely. One would have thought that, in the event of her foundering, there would be some traces upon the sea, especially upon a route followed by dozens of ships during the few anxious days after her disappearance, or that something from her wreck would have come ashore on that long coastline from Durban to Capetown. Yet never has there been the slightest trace of the *Waratah*, and her real fate is as much a mystery now as it was when she was posted as missing at Lloyds.

One captain, when he heard of her disappearance stated that he had seen what seemed to be a large ship on fire, and that so far as he could judge she turned round in her course, and made for Durban

again; his mate, however, suggested that the fire was more probably that of scrub on the shore, which is often on fire and may be seen from the deck of ships passing along this coast.

It seemed incredible that so large a ship, with almost 200 people on board, could disappear without trace, and that many at first refused to believe that she had met with disaster. Some held that she had broken down, and, being without wireless, was unable to communicate the fact, drifting steadily away all the time from the usual track of ships. Here was a case, then, in which the absence of wireless was regarded as a favourable omen. There came a demand for a search for the missing liner, and three warships and one mercantile vessel were sent to scour the seas. The owners of the *Waratah* sent the *Sabine* specially chartered for the duty, to follow up a theory which had obtained a good deal of support. It seems that about ten years previous to the *Waratah's* disappearance another steamer had broken down and went adrift in the same waters. She was eventually found near a very lonely island called St. Paul. The course of the drift was followed by the *Sabine* and St. Paul was reached. There were evidences there that the island had for long been the ocean graveyard of many a ship, wrecks being piled upon its desolate shores, but amongst them was nothing that could have been the *Waratah*.

There was a long correspondence in the papers about the sea mystery, the correspondents advancing most absurd theories, some not refraining from accusing the builders and owners of producing and running a vessel which they knew to be unsatisfactory in every respect. Fortunately, there was a

very clear answer to this. The builders, Messrs. Barclay, Curle and Co., had the highest reputation possible, and another vessel built to exactly the same specifications was running with every satisfaction. The owners were a firm whose honour stood too high to order anything but the best—proved by the fact of her classification by the surveyors of Lloyds.

Then came those cruel hoax-mongers who dropped forged messages overboard purporting to come from people aboard the ship, describing how she went to her long home. The mentality of these people, could they have been traced, would need examination. Let us be charitable in thinking them candidates for a lunatic asylum—it is impossible to imagine them as sane, healthy folk.

There was a Court of Enquiry, similar to that which was to sit upon the loss of the *Titanic* a few short years later, but the Court could only leave the mystery unsolved; they did, however, dispose of many of the false rumours and statements.

Some of the suggestions which were put forward to account for her loss may be briefly summarized. One, which found some support at first but was afterwards disposed of, was that her cargo had been badly stowed and that it had shifted and so led to her capsizing.

It was proved, however, that her cargo was properly loaded. Another that she carried too much coal on her spar deck; as a matter of fact her bunkers there were not half full, and very many vessels of similar tonnage did, and still carry a greater quantity in perfect safety. Still another cause of her going was suggested. It was that the storms, and the following hurricane, found her with open ports and

hatches, that the sea got in, and so she foundered. This is very unlikely, especially when it is remembered that the gales began as quite ordinary storms, and that the hurricane came the following day. No captain would have carried on in such conditions, and had he overlooked the fact that the hatches were insecure his officers and men would not have done so. Then there was the theory advanced, already alluded to, that she was unstable, and especially that she was top-heavy and would therefore be likely to turn turtle in the hurricane. Against such a charge there was the opinion of mercantile and naval experts who agreed, without question, that the *Waratah* was as stable a ship as could well be. Some of the passengers who had either made their voyages out or home in her on the first trip, or had been so fortunate as to quit the *Waratah* at Durban just before she disappeared gave evidence.

One gentleman, who quitted the ship at Durban, said that on the voyage from Australia to Durban he had observed that the ship rolled a great deal, and that she appeared to recover rather slowly, finishing up with a jerk from these rolls. Also that, for the greater part of the time, she had a big list, amounting on some days to 45 degrees. Another passenger, who had been a sailor, was also concerned because the list was so great that the water would not run from his bath. The first mentioned passenger had a curious dream which so impressed him that he took it as a warning, and left the ship at Durban, and what was more, he wired to his wife the reason that the ship appeared top-heavy. After the *Waratah* had sailed this passenger had another disturbing dream which he related to a

friend long before it was known that the vessel was overdue. In this he seemed to see the vessel in heavy weather, and then that she was turned right over by a large wave. These dreams may be well ascribed to the fact that the passenger was admittedly of a nervous temperament, and that, having early made up his mind that the ship was unsafe, his constant thought on the matter caused the dream.

What really was the end of the *Waratah*? The Court of Enquiry, after hearing all the expert evidence that it could muster, waiting its sitting until witnesses could be brought from the Antipodes, was unable to suggest any reason at all; certainly they could not agree that the ship was really top-heavy, or badly built.

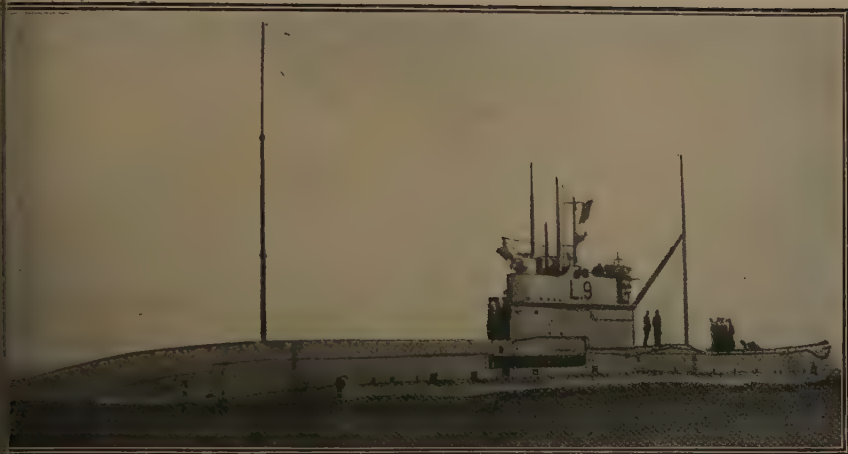
The most reasonable supposition is that she had an engine or steering gear breakdown during that terrible hurricane, and that whilst she was disabled she was capsised by the huge waves, perhaps her cargo having been shifted in her buffetings, and thus helping to the disaster.

In all probability the *Waratah* will become historic as the last big ship to disappear without trace; in future disasters the wireless S.O.S. will be sent out.

The full story of steam navigation upon the ocean is crowded into less than a century; like every new thing there was intense opposition to its coming. There were captains who point blank refused to take charge of the early steamers, even when, as in most cases, they were given steam as an auxiliary rather than the main driving force of their ships. We can well imagine how any of the early steamship disasters gave the old sailing masters a handle with which to belabour the new invention. The fourth

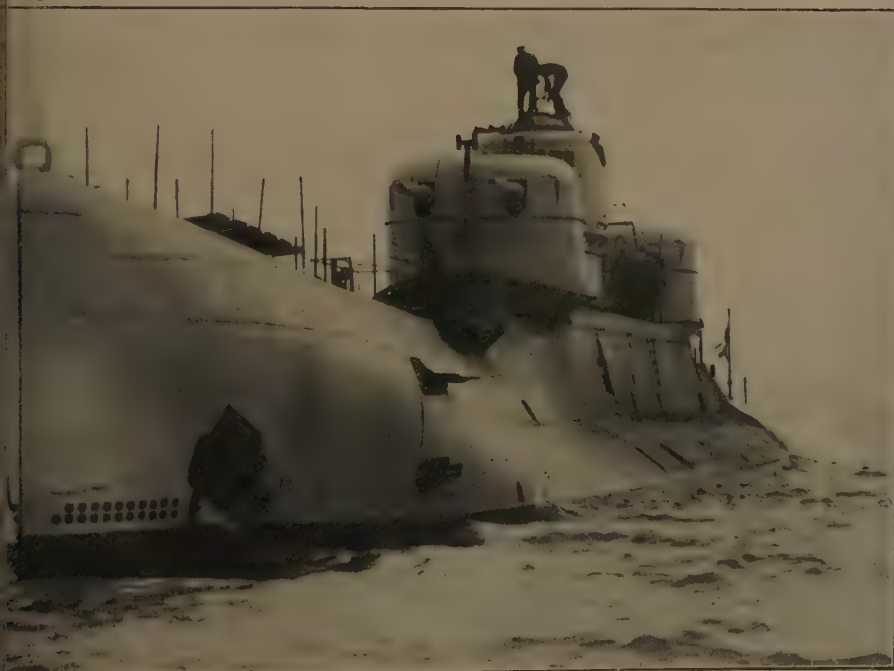
of the Atlantic liners, the *President* disappeared completely soon after going on the Atlantic service. It was a heavy blow for the enthusiasts who held that the steam-driven ship was much safer than the wind-jammer. Her crew and passengers numbered less than 150; even so it was a very large total for the 'thirties of the last century, and the loss of the *President* spread a feeling of uncertainty throughout the shipping world—it seemed that the steamer was no safer than the sailing ship. But there must always be set-backs in progress. It was so with the railways, with the motor, and more recently the conquest of the air has been bought at a fearful price paid for in human lives. In all probability the *President* ran into ice—either a berg or a growler, though at the time many thought she had broken her back and so foundered.

Another ship which disappeared without trace was the White Star *Naronic*—a cargo boat which went from sight in the early years of the present century. She was a fine and almost quite new vessel, so again we may suspect ice as being the cause of her mysterious loss. A stove-in boat bearing her name was picked up in mid ocean.



The British Submarine L9

One of the best type of submarines produced, built late in the War. Of about 1,000 tons, carrying one 4-inch gun and six torpedo tubes. The telescopic masts and periscopes are seen plainly. These vessels are considered about the best submarines of moderate size ever designed. Many of them are still in service.



Submarine X1

Reported that it is capable of remaining submerged for $2\frac{1}{2}$ days, and that it has an exceptionally long cruising circle. Designed for deep diving, construction is therefore one of exceptional strength.



H.M.S. "Australia" —Sister to Kent Class. Laid down in 1925.



H.M.S. "Cornwall"
Laid down March 11,
1926.

CHAPTER XXIV

SALVING SUBMARINES

MANY years ago the writer saw the first submarine recovered from the sea-bed. This was one of the A class, a mere pygmy to the submarines of to-day. She had been carrying out exercises off the Isle of Wight when a vessel crashed into her, and sent her to the bottom. There she lay for many days before salvage could be attempted. Then, by means of the camels, and the aid of divers, cables lifted her and so she was borne into dry dock. She looked a tiny mite of a ship in that huge dock, yet she had proved a rare handful in raising; no wonder that the very large submarines which have been lost in recent years have been left where they went down.

Very rarely indeed has it been possible to raise a submarine which has met with misfortune before her crew is either drowned or overcome by the foul air. Thirty-six hours is the maximum time which experts will allow for the men to exist at the bottom of the sea, and even then circumstances must be highly favourable. During the war our navy needed some specially fast under water craft. To supply this need the K class of submarine was introduced. Alone amongst all classes of submarines they used steam. Hitherto it had not been

thought possible for boilers to be used upon submersible craft. A submarine must be able to submerge quickly, her very life depends upon that fact. The problem was "How can the steam be emptied quickly from the boilers?"

Like most marine and other problems there was a solution, and it was found for use with the K boats. With oil fuel the fire was soon put out, but as it would never do to allow the boat to go down with steam in her boilers, as she would blow up immediately, it was arranged to seal the boiler room, and then allow the steam to escape into it. By so distributing the steam and allowing it to condense there was no danger of an explosion, thus the K boats could be steaming at full speed on the surface and yet within five minutes be sinking out of sight.

When the K 13 was finished building it was decided to give her a thorough test in a quiet Scottish loch. During the war it was necessary to rush vessels as quickly as possible into the fleet, since hostilities were taking a very heavy toll of naval as well as mercantile craft.

It is quite possible that all the men aboard the K 13 were not quite sure of their duties; at any rate some of the ventilators were not properly closed in the stern portion of the ill-fated craft, and she was at once flooded in her after portion. The whole of the men in that division were drowned out of hand; worse still the submarine was a prisoner, held down by that flooded stern portion. There were even more men in the front portion—forty-two in all—and their position was precarious in the extreme. Death faced them in three forms; either the bulkhead might give way and so flood the rest of the boat; the air supply must give out

in any case unless rescue could come quickly; and if the air held then there was scarcely any food or water aboard, as this was merely a trial trip intended to last a few hours.

For some time the imprisoned men endeavoured to pump out the flooded section, hoping that the boat would rise. But all their efforts came to nothing. Still the efforts were well worth making, because, in such a crisis as this, work of any kind is the finest antidote to despair.

Was there anything else to be done? There was just a chance, the kind of chance a gambler takes when he stakes all on the final throw of the dice. The conning tower was in the portion of the vessel in which these forty-two men were imprisoned, and the two officers in charge decided that the only chance for them and their men was to get out through the conning tower. They were to become living shot; the gun, the conning tower; the charge, compressed air. The officers climbed into the conning tower, which was then deliberately flooded to a certain depth, carefully calculated, and then the compressed air was turned on. It was called upon to force up the top of the conning tower against the weight of sixty feet of water pressing it down. It seems incredible that air should do what the strength of many men could not achieve. Those splendid officers, Commanders Herbert and Goodhart, experienced an upward rush of air; Commander Goodhart was caught in it and dashed to instant death against the steel sides of his prison, whilst his comrade, missing a similar death, merely by inches, was carried upwards in that fearful rush of imprisoned air and flung more dead than alive on the surface of the loch.

The non-appearance of the K 13 after several hours occasioned some anxiety to the attendant craft above. One of them was cruising over the spot where the submarine had disappeared when the men on this boat saw what they thought at first was a lifeless body come to the surface.

Commander Herbert was dragged on board and after treatment he was brought round and told his thrilling story. By good luck there was a salvage craft near, and not a moment was lost in attempting the rescue of the imprisoned men. Divers went down at once and began their search in the murky waters. Very soon the K 13 was located, and answering signals were made from the prisoned men to the knocking of the divers. Now came the problem of salvage which must be speedy if those valuable lives were to be saved. How could it be done?

There were two ways possible, both hazardous and neither of them promising too much in the way of achievement. The first was to stop up the openings—or rather suspected openings—for it was not known at the time what had caused the disaster—and then pump out the water. By doing this it was hoped to cause the submarine to rise, because it was certain that she had already a good deal of buoyancy, the stem being twenty feet higher than the stern. But here was a grave factor to be reckoned with. As so often happens the floor of the loch was coated with a very thick layer of mud, and in it twelve feet of the submarine stern was already deeply embedded. This meant that not only was she held very firmly, but the mud must have penetrated those open ventilators and made them difficult, if not impossible to find and

close. The rescue was so urgent that there was no time for experiment; what could be done must be done at once. The submarine was over 300 feet long and the only way of doing anything with her in a short space of time was to get her on end, bolt upright, and hold her in that position whilst the men were got out through her bows. But even this, to us a fairly simple operation, would take hours. Meanwhile the men below must be reassured. Somehow or other the divers must get messages to the prisoners, and if a way could be found of pumping in fresh air and liquid food, if solid was impracticable, then it must be found without delay.

If the names of any men deserve to be emblazoned on a roll of honour those of the divers employed upon the K 13 deserve it to the full. They worked twelve hours at a stretch on the sea bed; these fine fellows forgot all about the terrible strain upon them. One hour lost on their job might mean the loss of forty lives so they stuck to their work, work performed under the worst conditions imaginable. Thick, slimy mud in which they slid in all directions; mud which they could not help but stir up, yet, when stirred up, it blinded them for all practical work. They groped about in very considerable danger themselves. They had to pass strong wire cables round that slippery hull; these cables must be fastened to certain positions, fastened strongly and accurately, else the work of lifting would be hopeless. They knew that the submarine herself could not be lifted, only her front part, and an error in position of one cable might have proved fatal to the whole enterprise because it was something which had never been attempted before. Another

diver found the periscope, and then by means of an electric flash lamp, he sent the cheering news to the poor fellows inside that as long as they had strength to hold out they might hope for a rescue, even though they might have to wait long for it. The men in the submarine read the heartening message, but they could not send a reply. They kept their hearts staunch right throughout that awful vigil; there was no complaint, no trace of cowardice; nothing but a steadfast will to endure whatever might come.

Another diver took down a pipe and after tremendous work he found and opened a valve; the pipe was screwed into it and a message was flashed through the periscope that supplies of liquid food were coming down. When the food supply had satisfied the receivers, air was pumped down the pipe, thus new life was imparted to the men below. Better still the pipe enabled the men below to cheer up their rescuers. Voices from under the sea came in muffled tones asking what the weather was like and so on. Then a jolly jack tar called up "could you send us down a pack of cards; we should just love a game whilst we wait for you to get us up." The cards were obtained and sent down the tube, and doubtless the most remarkable series of card games was played in what still might become the tomb of the players. On the other side of that thin bulkhead over thirty of their fellows had already found their grave, yet in face of all this these men were able to sit down coolly and play cards. Never think them callous. Life in the navy is really one big gamble, and the training is such that the men are able to lose with a smile even when their lives are forfeit.

The flow of air from above was a great boon for the men below, who up to this point had been taking care of the compressed air, using it like men in a boat adrift would use a scanty water supply; indeed, they were able to help their rescuers, as, by turning the compressed air into the oil bunkers they were able to blow these out, and the weight of the oil gave place to the lifting power of the compressed air.

Now came the critical moment of lifting. As many salvage craft as could be brought together in that short time were assembled over the K 13, and at a given signal the task began of pulling up the bows of the submarine. For a time they appeared to strain in vain, but the steady pull of the salvage craft won through, and the mud gave way. Gradually the nose of the submarine came to the top and there was a little cheer as it broke the surface of the water. The cheer was mixed with anxiety because there was the thought ever present that before anything more could be done the cables might slip and the submarine slip back to her grave.

Not a moment was lost—the salvage men had their blowlamps ready; these cut through the bows of the raised K 13. Never until that moment had it been realised how well the builders of the submarines had done their work; those stout plates took a great deal of burning through, and the moments seemed to grow to hours, though really the time could be measured in minutes.

At last the outer hull was cut through, but still there was the inner casing. A small hole was cut in this and a tremendous rush of air came through it blowing out the powerful flame of the lamp which the salvor was using. "Send me matches quickly,"

he cried, but before they could come down from the attendant boat, a hand was thrust forth from the submarine and a voice exclaimed, "Here you are mate, and good luck to ye." That was the cheeriest message of hope that could possibly have come from the K 13, and the salvors redoubled their efforts to enlarge the hole. So soon as it was big enough for a man's head and shoulders to come through, the forty good fellows who had spent nearly sixty hours in this veritable steel prison were dragged out one by one and taken to the shore. Not one of them would admit being any the worse for their adventure, and they were quickly on the active list again.

That the work was carried out without pause was a fine tribute to the salvors, especially when the fact is added that a storm sprang up within an hour or two of the men being got out, and, as was anticipated, the cables snapped under the strain and the K 13 went down again. She was too good to be lost, especially in those critical days, so salvage was again attempted and successfully carried out. The compartments were pumped out one by one, and then compressed air was forced in so that she became buoyant. But she did not rise—that awful mud had got hold again, and like some giant sucker held the otherwise lively craft to the bottom. A remedy for the mud was found when the powerful dredger pumps were brought. In very quick time the pumps sucked away the clinging mud and silt, and soon the K 13 shot up to the surface. She was taken to dry dock, and the bodies of the poor fellows who had been lost in her first plunge retrieved; thoroughly overhauled and under a new number, she then joined the fleet.

One of the most remarkable stories concerning a submarine belongs to the war and the vessel was a big German U-boat, its number 44. Her captain had the reputation of having been singularly ruthless, and one story at least shows him to have been a most callous fellow, richly deserving the fate which overtook him.

It seems that besides destroying our vessels he was instructed to do some minelaying in the St. George's Channel in the hope that British steamers—or foreign, and particularly those to and from Ireland, would be caught in the mine field and sunk. By great good fortune the first ship to be sunk by these mines was the U 44 herself; either she hit one of our mines, for we had to lay them to catch the U-boats, or else she hit one of her own. At any rate her stern was blown away and she sank like a stone. The noise of the explosion was heard on the Irish coast and some fishermen, believing that one of our ships had been torpedoed near the land, went out to search for survivors. A faint cry was heard and racing in the direction whence it came a solitary head was seen. The man was pulled into the boat and hurried to the shore. Instead of a merchant seaman or a passenger from a liner the man proved to be one of the men from the U 44. The man was already far gone, and beyond uttering a few words which told the above, he was unable to give further account before he died from the shock of a long immersion in the sea.

It was desired to know as much about the German submarines as possible, also there was a chance that papers aboard the U 44 might give us important information respecting others and their operations round the coast; it was therefore decided that the

wrecked craft should be salvaged. The mine sweepers had first to get busy and one of them was sunk by a floating mine, either one of ours or more likely one of those dropped by the U-boat. The salvage men with characteristic thoroughness raised the sweeper first before tackling the U-boat. Then the bed of the sea was swept and the submarine was located in something under 100 feet of water, which meant that divers could work there, though the swift currents made their job rather a precarious one. Owing to the extensive damage to the U-boat it was seen at once that without a good deal of patching she could not be blown out and so lift herself, therefore another plan was adopted; i.e. salvage by means of "camels."

Cables were passed under the wreck and buoyed until the lifting craft could be brought along. Then bad weather supervened and nothing could be done for weeks on end—that is one of the drawbacks of salvage, the finest men and the best apparatus may be available but Father Neptune will have his say, and he says it in such a way that there is no answer save "Wait and see."

The lifting vessels are big barges fitted with tanks. These can be filled and emptied at will. When a lifting barge is placed on either side of the spot below where the wreck is located, the cables are taken off the buoys and attached to the barges. Water is then admitted into their tanks, and they sink something like five feet into the sea. As they sink the cables are tightened to the new adjustment, so that they are quite taut.

The tanks of the lifting vessels are then pumped out and up they come the five feet or so which they have been lowered. This swings the wreck which

they are lifting clear of the sea-bed, and the salvage vessels, assisted by tugs, now begin to tow their burden in towards the shore, proceeding as far as they may.

In most cases the water shoals gradually as the shore is approached; there comes the moment when the wreck touches bottom again, and the operation must be repeated. But there is one important factor which saves a good deal of pumping out, etc., if properly used—the tide. In lifting the U 44, the tide was made to serve in no uncertain fashion. The lifting vessels were taken over the wreck and secured at low tide. The tide off the Irish coast rises something like twenty feet, and this amount had to be added to the lift of five feet of the salvage barges. These figures are only approximate, and it must not be assumed that the U 44 was actually lifted twenty-five feet from the sea-bed at each operation.

In the case of this submarine two separate lifts brought her nearly two miles towards the shore, then for a time weather conditions stopped the work.

There was one very serious factor to be considered in the salvage of this U-boat; she was loaded with mines. It was impossible to avoid a certain amount of bumping on the sea-bed when the U 44 was in the sling; above were the salvage craft and their gallant crews. What if a more severe bump than usual exploded one or more of those deadly mines? True, they were down below, but only those who have seen a mine exploded have any conception of its enormous destructive power. On one occasion the submarine slipped from her slings and dropped rather heavily upon the sea-bed. Really she ought to have been blown to smithereens there

and then, also the craft above. But the Germans apparently realised that their cargo was singularly dangerous, and they had the mines stowed very carefully.

When the submarine slipped from her slings there was some anxiety, especially when the slings had to be swept under her again. The buffetings to which she had been subjected ought to have loosened the mines and any further movement might explode them. There was no need for Commander Davis, in charge of the operations, to impress upon his men that the utmost care should be taken; their lives were forfeit if they did not take every imaginable precaution.

The gale which sprang up put one of the lifting craft *hors-de-combat*; in fact she almost sank despite her buoyant tank. She had to be replaced, which meant another serious delay when delays were exceptionally dangerous, but these salvage men had developed true patience, and they met rebuffs as calmly as success.

Work went ahead again, and now came another check, immediately after this second start. As they were working the submarine inshore an obstacle was encountered; it was a bar of sand which rose steeply from the sea-bed, the work of tide and storm. The U 44 had to be lifted over that fourteen feet barrier; this meant tilting her so that she was at an exceptionally awkward angle. Did the slings slide backwards (they could not be fastened tightly to the hull of the wreck), not only would the danger of an explosion have to be faced, but now in shallower water it would be especially disastrous.

By careful adjustment of the lifting vessels the bar was surmounted, and soon afterwards the U 44

was beached in a position where she could be got at in safety and her secrets revealed.

The first of these was twenty-one dead Germans, whose bodies were at once sewn in canvas and taken out to sea and given a proper sea burial.

The next secret was the presence of nine mines, really these were dealt with before the crew. Then there were confidential papers and the design of the vessel herself to be examined and noted.

Whilst we may have been able to build as good and probably better submarines than those of the enemy, the time has passed when the British Naval authorities were beyond learning a lesson from their rivals.

CHAPTER XXV

SOME STRANGE ADVENTURES OF THE SEA

THE finest ships of the eighteenth century were the East Indiamen. These splendid vessels, small though they seem to us to-day, were as much an advance on the cockle shells of Columbus and his contemporaries as the big liner to-day is an advance upon the clipper ships of the 'seventies.

The East Indiamen had to voyage via the Cape of Good Hope, and if the winds were contrary, months were taken in either direction. The sea, and the land too, took toll of these splendid ships as it did of the earlier and smaller vessels. It sometimes happened that the commander and crew were not equal to their task; too often the crew were a scratch lot of fellows, picked up from the worst districts of London, many of them taking service because they were destitute. With such a crew it was necessary that the commander and his officers should combine strict discipline with some regard for the comfort of the men. Too often the captain was a tyrant, ill-treating the sailors, and sometimes feeding them on food not fit for pigs. The weevil biscuits and rotten salt horse of Marryat and Kingston are no flights of novelist's fancy; they were the common experience. No wonder the poor fellows became drunken, finding in raw spirit a solace and



Slocum's "The Spray"

The story of the "Spray" has not been given in this volume, since it has been told by that bravest of navigators, Captain Joshua Slocum, in his own inimitable way. His book "Sailing Alone Around the World" is the epic of the single-manned ship.

The "Spray" took over three years in her remarkable voyage; sad to say on a later venture she was lost—how, when, or where no one knows. But we may be quite sure that her going was in keeping with her life, and that her skipper met whatever fate awaited him with the courage and fortitude, which he had displayed on countless occasions when he circled the globe.

The tiny "Spray" measured 36½ feet long, 14 feet 2 inches wide, four feet two inches deep in the hold, and her tonnage was nine tons nett.

a palatable addition to their horrible fare. Such conditions often led indirectly to the loss of a ship; in sudden danger these were not the men to call upon for quick response. Discipline of the iron border broke down in such an emergency, and there are many cases on record in which a ship might have been saved had the men not become panic-stricken at the first alarm. Nothing is so contagious as panic, and nowhere is panic more dangerous than on shipboard.

Here is a glimpse of a wreck in which a horrible state of things came about through some of the causes outlined above. The East Indiaman *Grosvenor* was homeward bound from Ceylon in 1782.

She appears to have got out of her course when approaching the Cape, striking suddenly three hundred yards from the land, her stern being high and dry, whilst her stem was almost on water level. The disaster occurred so suddenly that there was great confusion, especially amongst the passengers. So soon as the ship had become fast on the rocks, the captain ordered the masts to be cut away, and then he considered what steps should be taken to save his people. Some of the crew attempted to swim ashore with a line, and after several repulses they managed it. A large number of natives now came along the beach and offered their assistance, which the crew were only too glad to have, though they misdoubted the genuineness of the black fellows' intentions. The boats had been dashed to pieces in an attempt at launching. As the crew got to work upon building a raft they were able to see the natives stripping the iron from the masts, which had floated ashore. This was not a good portent. At length the raft was finished, and tied

to a hawser, in order that the women and children could be landed in successive journeys. The hawser was used to steady the raft and to bring it back again from the shore. Alas, the hawser though quite new, snapped almost immediately, the raft turned over and drowned the sailors who had been working upon it. Many now attempted to get to shore by using another hawser, which had been taken through the sea by the men who had reached land. Quite a number managed to get through the breakers, but a heavy toll was taken by the sea, fifteen of the crew perishing in this manner.

Then, within an hour or two of striking, the ship broke in two. By great good fortune the wind floated the halves nearer the shore, and thus allowed the bulk of the people to land fairly easily. It was now getting nearly nightfall, and the natives, having plundered everything they could, went home. The captain set about making some sort of shelter for the women and children under his charge, and some fires were kindled from the wreckage.

The position of the shipwrecked was a strange one; at this time little of South Africa was settled by white men, and not a soul of the party knew how far away these settlements were. The captain, to whom everyone looked in such an emergency as this, was quite unable to say what part of the coast he had struck, or whether they were 100 or 600 miles from an European settlement. All that he could say was "If we march southwards we are bound to come to civilisation." Poor comfort this for so large a party, depending entirely upon anything which was washed ashore from a ship fast breaking up. In addition, the natives, though they offered no violence to the white people, insisted

upon helping themselves to anything they fancied; it did seem as if they would ultimately fancy the whole! So powerful were they, and so afraid of incurring their enmity were the shipwrecked people that they allowed the natives to help themselves, resting content with just a few articles which seemed necessary for their projected expedition through unknown country.

To cheer his despairing people the captain predicted that within a fortnight they would be amongst the Dutch settlers, and all would be well; it was pure guess work, however, and it is very probable that he fully realised the great dangers which lay in their path.

Soon after they set out they were met by a party of kaffirs, at whose head was a Dutchman. Many of the shipwrecked hailed this as a certain sign that they were approaching civilisation; far from the case it proved. This white man had fled for his life after committing murder, and had got as far from his countrymen as possible. Efforts were made to induce the Dutchman to become their guide, a large sum of money being offered. On no account would he undertake this, pointing out, not only the great danger to himself if he were successful, but also that the journey was practically impossible, burdened as they were with women and children. He advised them to stay with the natives, but none of the company was agreeable to this. Already they had suffered from native attacks and threatenings, and there seemed but one thing to do; it was to push on. The very next day they suffered a serious attack from the natives, and a sort of running fight was kept up for hours in which none were killed, but a few received wounds from

native lances. Trout, the Dutchman, caught them up the following day and said he and his people had been to the wreck and secured a great deal of plunder. The suggestion was made that they should return there, and try to build a boat to go by sea to the Cape.

During the nights when they encamped great fires had to be kept going to scare away the attacks of lions and other wild beasts. By day the natives molested them, and then when they left them, there was no peace because of the animals in their way. The seamen began to complain that all would be lost because the women and children were such an encumbrance, and prevented them travelling at more than a snail's pace. To placate them the captain agreed to divide the party, probably with the idea that the men could push along more quickly and so bring help to the slower travelling division.

The story of that terrible struggle to civilisation is too long to tell here; only six out of the 135 who landed from the wreck reached the Dutch settlements, but an expedition sent out succeeded in rescuing another twelve men who were either making their way slowly south, or had sought refuge in the native villages. Some of the natives had been friendly and had helped the survivors but, in most cases, they had been robbed of all which they had. Then they had dropped by the way and been left to their fate. The women and children all perished, though how and where will never be known. A legend persisted for many years that they had been captured and taken to a native village, but although attempts were made to discover the truth of the story they were never found.

The early days of steam upon the Atlantic had more than its full share of losses and a good deal of prejudice which already existed against the steam liner had to be combated and worn down, mainly because here and there the detractors of steam could point to great and outstanding losses. But these detractors almost invariably forgot to point out that the losses, however deplorable, were equalled in number, if not exceeded, in the sailing fleets. At one point perhaps there was an advantage with the older vessels in that the loss of life in a steamer was usually much greater than in the sailing-ship. For this was a very easy explanation; one in fact, which, despite the croakers, rather showed that the general public was more trustful of the new method of transit. In the days of sail few people travelled across the Atlantic save under stern necessity, but once it was proved the steam-driven liner was reliable, that it would really cross in a fortnight, under normal circumstances, instead of a month or even six weeks taken by a clipper or brig, which often had the misfortune to lay becalmed for days on end, people began to cross the ocean as a matter of course. They crossed to visit friends, they crossed for business, but in those days people did not travel in steamships as emigrants—that belonged to a later and more enlightened period.

Thus, the loss of the *Arctic*, one of the best of the new Collins liners in 1848 with over 300 lives was a big blow both to American commerce and the steamship world generally. The *Arctic* was one of four beautiful sisters, quite the finest quartet then on the Atlantic. Her sailing list filled up rapidly on each of her voyages, and our own Cunard Company was rather badly hit by the desertion of

some of its patrons to whom the increased speed and greater comfort of the American liners appealed.

The *Arctic* set sail on her last voyage with many distinguished people aboard in September, 1854. Off the dreaded Cape Race, with its oft recurring fogs, and in one of the worst of them, a small French steamer, the *Vesta* crept up and rammed her nose into the *Arctic*. There was no sign of the French vessel only a moment before; when they both hailed it was too late, and a fatal blow had been given. Yet it was not deemed fatal to the American giantess; indeed she turned to help her smaller sister, which was showing signs of foundering. The captain of the *Vesta* decided that his only chance was to go as far and as fast as his engines would allow in the direction of St. John's, Newfoundland, the nearest port. The *Vesta* thus disappeared in the fog, the people on the *Arctic* thinking that she had foundered.

The injury to the larger vessel did not appear vital, though her upper works were damaged badly and it was thought that she could proceed on her voyage. Alas, within a few minutes some startled heads shot up from the stokehold to say that it was flooding rapidly, and that in a very few minutes the fires would be put out, which meant that the good ship would be helpless. The captain at once turned the head of the ship in the direction of Cape Race, deciding that he might just reach it. But the damage was more serious than even he had believed, and soon the *Arctic* was settling down for her last plunge. Boats were got out, and, as is usual in hurried embarkation, several were upset and their occupants drowned. Only fifteen out of her passenger list of 233 were accounted for, whilst the crew suffered heavily too, in all 322 people were

drowned. These figures seem large to us even now with the greater disasters of modern years, and, indeed, proportionately the loss of the *Arctic* was a greater disaster than that of the *Titanic* or the *Lusitania*. When two years later the *Pacific* of the same line went without trace there was quite a scare, a scare which, with other things, involved the failure of the Collins line.

An almost similar disaster occurred not so very far from this spot in much later years, indeed within a few months of the loss of the *Titanic*. Here the *Empress of Ireland*, one of the two crack ships of the Canadian Pacific line, was sunk by a comparatively small vessel. The splendid liner received such a vital wound that she sank very quickly, taking down with her the majority of her passengers and crew.

Much earlier, and in similar circumstances, the French liner *La Burgoyne* was run down and sank. In this case there were terrible scenes in the fight for the boats. Discipline broke down completely, and the crew, against all the traditions of the sea, placed their own safety before that of women and children. Not often does this happen, fortunately, and most probably in this case the panic was started by a single unbalanced member of the crew.

By collision also was lost the Cunarder *Oregon*, the fastest ship of the day. She was carelessly run down by a much smaller ship and sunk, but every soul was got off the gallant ship ere she took her last plunge.

The North German Lloyd ship *Elbe* was only a few hours out from Bremen when the English ship *Crathie* crashed into her, dealing her a terrible blow. Within a few minutes the *Elbe* was at the bottom,

taking with her 334 people, only sixteen of her complement escaping a watery grave. There was a considerable stir about this collision, it being held that the captain of the *Crathie* behaved in a callous fashion. The *Crathie* backed out of the hole she had cut in the German vessel's side, and proceeded on her way without attempting any assistance or even making an inquiry of the *Elbe*. It was held that she should have stood by, lowered her boats and done what she could. When the *Crathie* reached Rotterdam she was arrested, and very large damages had to be paid to the owners of the *Elbe*, because it was proved that the fault was that of the British ship.

CHAPTER XXVI

THE MOTOR SHIP

WITH the rapid development of the internal combustion engine it was inevitable that the question of its application to various craft should receive consideration. Very soon, for small boats, such as launches, etc., the petrol motor was acclaimed the ideal, but it was quite a different proposition when large craft were involved.

Dr. Diesel had, for a long time, been experimenting with the engine which now bears his name. From the first he realised that the high speed petrol engine, with which we are so familiar on land, would not do for the ship, so we find special types of engines being evolved, whose action was comparatively slow.

At first it was believed that the internal combustion engine would be suitable for vessels up to, say, 5,000 tons, but constant improvement has been made, and such economy attained, that the standard liners of to-day, i.e. ships with a tonnage of 15,000 to 20,000 are being equipped with motors. If we remember that, in the opinion of many competent judges, the hey-day of the mammoth liner is past, save for a limited fleet on the North Atlantic, then, indeed, the future of the steamless liner is rosy indeed. To burn oil is wasteful in the extreme, even when we allow its undoubted superiority over

coal. To convert the oil to gas and then use it, is a far more satisfactory method altogether, and in this the future of the liner is closely bound up.

The first motor-driven craft were quite small ships, but they did some remarkably fine work, and, after the experiments had been fully carried out and reliability attained, the next step was to apply the new motive power to the liner proper.

The Elder Dempster must have a great deal of the credit for introducing the motor liner. In 1921 they had delivered to them the twin-screw motor vessel *Aba* for their services to the West Coast of Africa. This ship claims to be the first *passenger* liner in the world to be driven by internal combustion engines. A year later she was joined by the *Adda*, a similar, but improved ship. On both these coal is unknown, and the motors have been employed to produce a good deal of electric current in order that as many items as possible may be accomplished by this useful agent. From the brushes in the barber's shop to the steering of the ship, all possible use is made of electricity. The galley utensils are also controlled by electricity, and by pressing a button eggs are scrambled or stoves cleaned.

In outward appearance there is nothing to distinguish these motor ships from their sisters which depend on steam. In the earliest examples of vessels driven by internal combustion engines, the absence of the funnel was at once noticed, but the funnel is extremely useful in a motor ship to carry away the fumes, also for ventilation purposes, so it comes back, the ship gaining greatly by its return.

A brief description of the *Adda* may be given. Built by Harland and Wolff, she has a length of

450 feet, beam of 57 feet, and a moulded depth to awning deck of $34\frac{1}{2}$ feet.

She possesses a sea speed of 14 knots, whilst her displacement is approximately 12,800 tons, her gross tonnage being, of course, much less than this. Her passenger accommodation is as follows, first-class, 225, second, 74, and third, 32. It is interesting to compare the proportion of 1st, 2nd, and 3rd class passengers upon ships plying to the West Coast of Africa with those on the Atlantic and Oriental services.

The small number of third-class passengers accommodated proclaims that there are fewer people bent on pioneering in this part of Africa.

The fittings of the cabins, etc., leave nothing to be desired. Only those old stagers who can remember a journey to the West Coast in the sailing ship days can appreciate the enormous advances made.

One great feature of all these boats, steam and motor, is the splendid manner in which they keep to their time schedules. On the North Atlantic express services we are used to this, and expect it, but here it is equally good.

Perhaps the most important new feature on the motor ship is the provision of an auxiliary 100 K.W. dynamo, situated at the after end of the awning deck. This dynamo alone is capable of supplying all essential services, and could, in emergency, continue to supply the vessel with light and power. This is most important. Too often has a ship been rendered helpless by the flooding of her engine rooms, which has resulted in the wireless plant being put *hors-de-combat* at a time when it is most necessary, whilst the ship has also been plunged into darkness.

The propelling machinery of the *Adda* deserves a special note. It consists of a 28-cylinder, 4-cycle Diesel oil engine of Harland and Wolff's standard type of the well known Burmeister and Wain system. The engines develop a normal horse-power of 6,000 at 115 revolutions per minute. Compressed air for fuel injection is provided from 3-stage air compressors, mounted in tandem at the forward end of each engine, and driven off an extension of the crank shaft. The engines have forced lubrication throughout, and the cylinder jackets and cross-head guides are cooled by sea water, fresh water being used for piston cooling. The air for manœuvring purposes is stored in three reservoirs at 26 atmospheres, the former being charged by two three-stage electrically driven air compressors.

Now here comes the very great advantage of the internal combustion engine as regards its fuel. The *Adda* can carry enough oil in her double-bottom and tanks to take her out to West Africa and back.

Other motor liners have this accommodation increased so that they may go round the world, if need be, without replenishing. In the case of the *Adda* 820 tons of oil can be stored, and this can be taken aboard within a few hours without dirt and inconvenience.

Another line which has adopted the motor-driven ship for many of its services is the British India. As part of the post war reorganisation of a reduced fleet twenty new vessels were placed on order. Amongst them were the *Domala* and *Dumana*, which, whilst built on similar lines to many of the ships then added to the fleet, differed in their motive power.

Whilst the accommodation of these ships is interesting, and of the same high standard for which

the B.I. is noted, it is the engine-room which attracts attention, for here all is so different from most of the other vessels trading to the East. These huge internal combustion engines come from the North British Diesel engine works, a recent foundation to keep Britain's end up in the construction of the new type of propelling machines. On nineteen tons of oil a day these engines run these comparatively big ships, whereas, for the same speed, about eighty tons of coal would have been required. In order that the relative merits of each method of propulsion may be fully determined, the British India have vessels of the same tonnage and class running under the following conditions: (1) reciprocating machinery fired with coal; (2) geared turbines driven by oil-fired boilers; (3) reciprocating engines fired with oil-fired boilers; (4) geared turbines driven by oil-fired burners; and (5) the motor driven ships mentioned above.

From the fact that several more motor ships of the D class are being placed in service, we may conclude that this type is very successful upon the work for which it has been designed. For a company like the B.I., which has numerous ships of relatively small tonnage at work far from home ports, the internal combustion engine offers a wide field for experiment. And as coaling such steamers is a difficult and expensive process, we shall probably see the motor-ship supreme in this fleet.

In Italy there have been built two very large motor-driven liners with tonnages in the neighbourhood of 30,000. These are opening up a new era in the Mediterranean-American traffic; this had always been in the hands of British and German companies. The engines of these new liners were manufactured in Germany.

The *Aorangi* has joined the fleet of the Union Steamship Company of New Zealand. She is a fine-looking two-funnelled boat, and was built at the famous Fairfield Yards, Glasgow, from which she was launched in June, 1924, making her maiden voyage in the opening week of 1925. The *Aorangi* is over 17,000 tons gross, and has a length of 600 feet, 72 feet in beam, and 46½ feet deep. She has all the neatness of an ocean flyer with the lines of a yacht, and is a real triumph for British skill.

The *Aorangi* has accommodation for 440 first, 300 second, and 230 third class passengers, and she has a complement of 330 officers and men, a total much less than in a steam liner because of the practical elimination of the "black squad."

The main engines are four in number, driving a similar number of propellers. A speed of eighteen knots is attained without unduly forcing the machinery. The engine type is known as the Fairfield-Sulzer-Diesel, and they operate in what is called the two stroke cycle. Each motor has six cylinders of 27½ inch bore. Electrically driven turbo blowers scavenge the cylinders of exhaust gas, and two three-stage compressors supply the compressed air for the fuel injectors.

The *Aorangi* carries 3,000 tons of oil fuel, and this quantity is taken on her American terminal, proving sufficient for the round trip, which equals thirty-six days running.

Three very large motor liners are now in service from Harland and Wolffs. The *Asturias*, for the R.M.S.P.C. is their largest vessel, exceeding 20,000 tons. So far she has created a highly favourable impression in all who have to do with her. One feature she has which definitely marks her away

from steamship practice. Unlike the *Aorangi* her two funnels do not conform to the usual practice; in the *Asturias* they are very short, and of much greater girth than found on steamships. Their shortness proclaims the fact that they are not for use as smoke vents, but rather as ventilators to the big engine rooms below. Some critics think the change is unwise, but as designers have never conceived funnels as purely ornamental the new type is likely to persist.

The second big motor-ship, the *Alcantara*, is a sister ship to the *Asturias*. Still another motor-ship, the *Carnarvon Castle*, joined the Union Castle fleet in 1926, and is the first vessel in that celebrated fleet to exceed the 20,000 tons. A sister vessel is in hand at the time of writing.

The passing of the 20,000 tons by these companies and especially by motor-driven craft, marks a revolution in liner practice.

The question will be asked on all sides "Is the steam liner doomed?" The answer to this question is difficult to frame. But it is amply clear that the internal combustion engine has by no means reached its limit, whilst many experts are under the impression that the steam-driven liner has almost, if not quite reached hers, if judged from an economical standpoint. The new Parsons Turbine, high-pressure water tube boilers, and pulverised coal—the latter fed to the boilers in the same way as oil—may yet give the steamer a greater span of life than would appear. The new White Star *Britannic* for the Liverpool—New York service is the first motor-driven ship in that fleet, but others are contemplated, so that the type of craft has definitely invaded the select ranks of the North Atlantic express service.

CHAPTER XXVI

THE COMING OF THE ELECTRIC SHIP

No sooner had the motor liner begun to displace its rival of steam on all the ocean routes than another challenger appeared. This is the electrically-driven ship, in which, in many cases, the steam engine comes back again.

At the moment opinion is acutely divided upon the question whether the generative agent should be high-speed turbines, driven by steam from very high-pressure boilers, or whether the Diesel engine being less trouble and cleaner, should not be used for driving the dynamos. It is more than possible that the fight will be definitely decided within the next five years on the North Atlantic.

Here the struggle for the Blue Ribbon, held for more than twenty years by the splendid *Mauretania*, is likely to be renewed with all the glamour of those years which followed immediately the introduction of the twin-screw liner.

The new White Star mammoth is to be electrically-driven, but at the moment of writing it has not been definitely decided whether the generating plant shall be operated by Diesel engines, or by high-pressure steam turbines. The latter are constantly being

improved, and their limit is by no means reached, which explains why the final plans of the White Star ship still remain incomplete, though she is growing daily on the stocks.

The Cunard have an even larger ship planned, and are expected to go at least half a knot better than their White Star rival, which will probably attain twenty-seven knots. The new German fliers, *Europa* and *Bremen*, which have the same tonnage as the *Olympic*, and will not thus rival in size the "Big Three" already in service, are quite expected to take the Blue Ribbon from the *Mauretania*.

Then the French Line are busy with plans for a speedy 50,000 tonner, and those who know what the Frenchmen have accomplished with their present "big three" will not be surprised if this new ship does not enter the contest. Nothing definite is known about her propelling machinery, but it is likely to be turbo-electric.

The Italians, who have been leading as regards size with the motor liner, announce that they are entering the lists with some record breakers which may, or may not be electrically-driven.

Finally, Uncle Sam is determined to have the lion's share of the really fast traffic, and as his patrons can pay, there can be no reasonable doubt but what he will succeed. Apart from super-Leviathans which are promised very shortly, there is the projected fleet of super-Mauretanas which will possess the machinery of the fastest cruisers, and will give a sea speed of thirty-five knots. If this speed be attained by a liner it will be at a luxury cost, and is hardly likely to have emulators from Europe. There comes a time when the economic axe cuts

across such expenditure, and one may well draw attention to the fact that the Americans have never been able to compete successfully with their European rivals because of their higher operating cost.

THE END

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